A330-200/300
TECHNICAL TRAINING MANUAL
GENERAL FAMILIARIZATION COURSE - T4 (RR Trent 700)
PART 2 OUT OF 2

This document must be used for training purposes only

Under no circumstances should this document be used as a reference

It will not be updated.

All rights reserved
No part of this manual may be reproduced in any form,
by photostat, microfilm, retrieval system, or any other means,
without the prior written permission of AIRBUS S.A.S.

PART 2 OUT OF 2

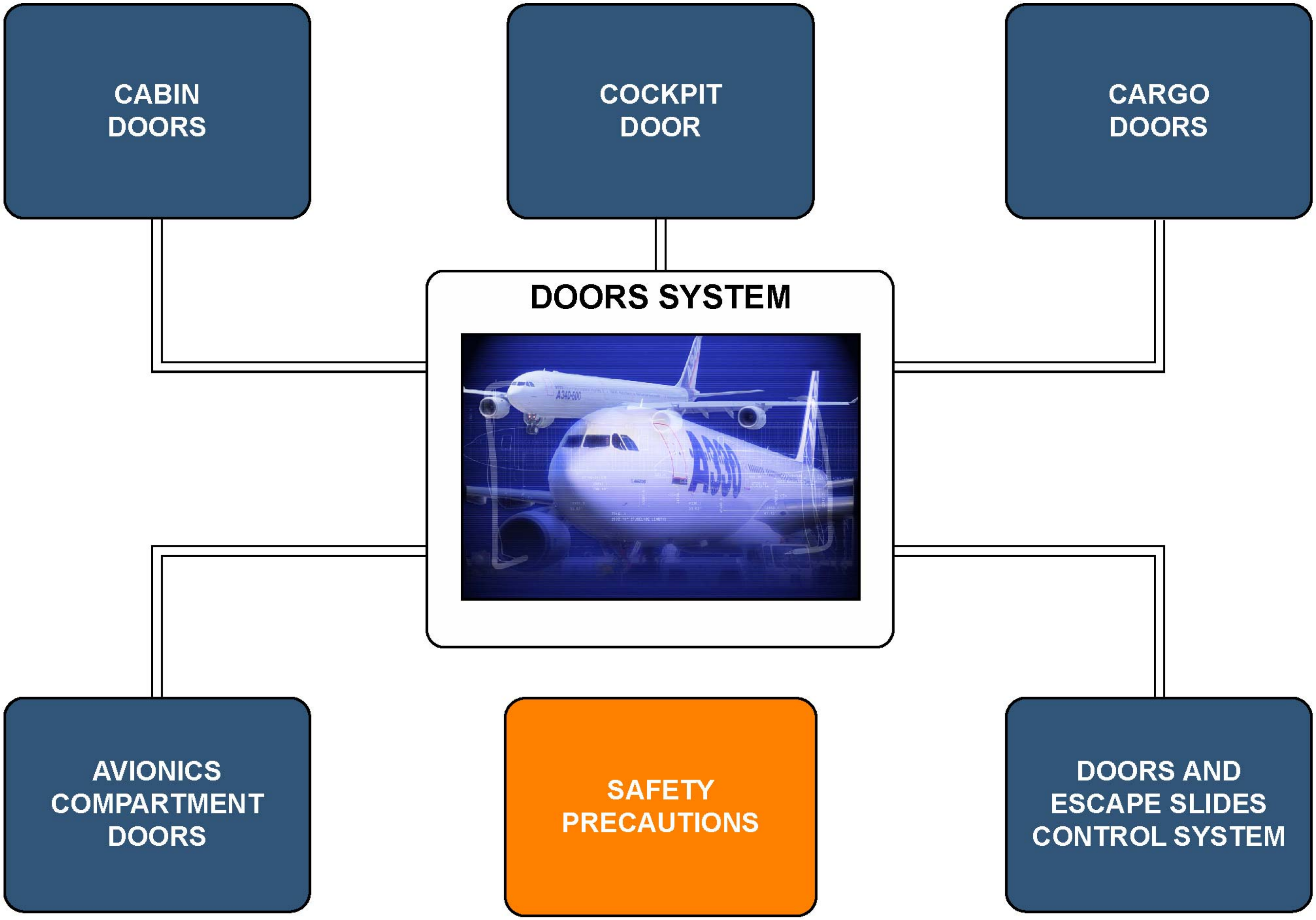
52 Doors System Presentation (1) 2
25 Equipment/Furnishings System Presentation (1) 56
35 Oxygen System Presentation (1) 116
38 Water and Waste System Presentation (1) 140
28 Fuel System Presentation (A330-200) (1) 172
28 Fuel System Presentation (A330-300) (1) 226
26 Fire Protection SYS Pres. (RR700) (1) 270
49 APU System Presentation (1) 318
70 Power Plant RR Trent 700 Presentation (1) 350
36 Pneumatic SYS Presentation (RR700) (1) 416
21 Air Conditioning System Presentation (1) 434
30 Ice & Rain Protection SYS Pres. (RR700) (1) 488
00 Circuit Identification Presentation (1) 526
05 Time Limits and Maintenance Checks (1) 540

52 DOORS SYSTEM PRESENTATION (1)

SYSTEM INTRODUCTION

The doors system has:
- the cabin doors,
- the cockpit door,
- the cargo doors,
- the avionics compartment doors,
- the Doors and Escape Slides Control System (DSCS).

When you operate on the doors system, you must obey all the safety procedures listed in the AMM.



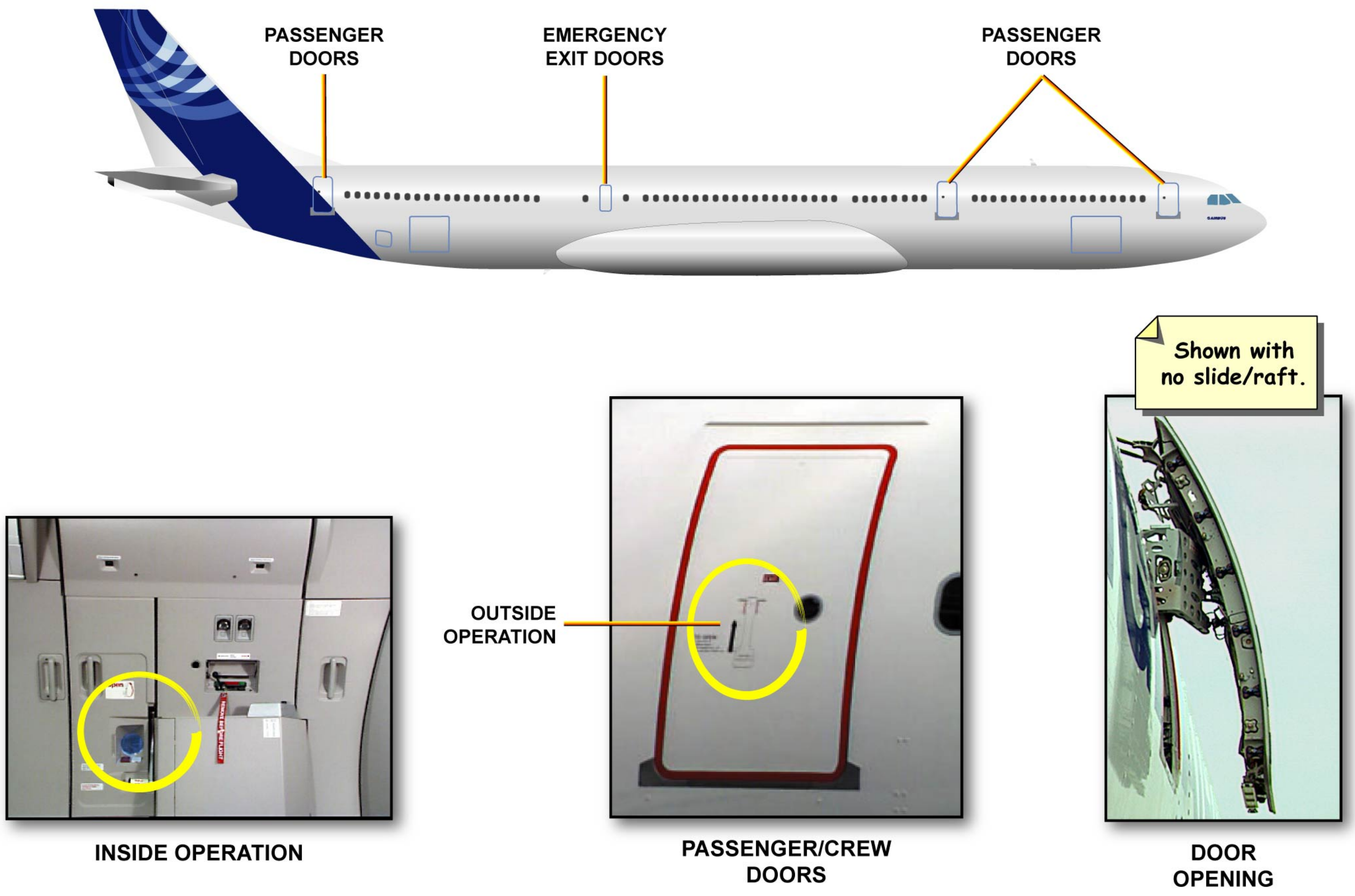
SYSTEM INTRODUCTION

G6B08031 - G10T4T0 - FM52P7000000001

52 DOORS SYSTEM PRESENTATION (1)

PASSENGER AND EMERGENCY DOORS

The cabin doors are the passenger doors and emergency exit doors. They are used as entrance and exit doors for the passengers and the crew. They are of a fail-safe plug type construction and open out. They are parallel to the fuselage. They can be operated from inside or outside of the aircraft.



PASSENGER AND EMERGENCY DOORS

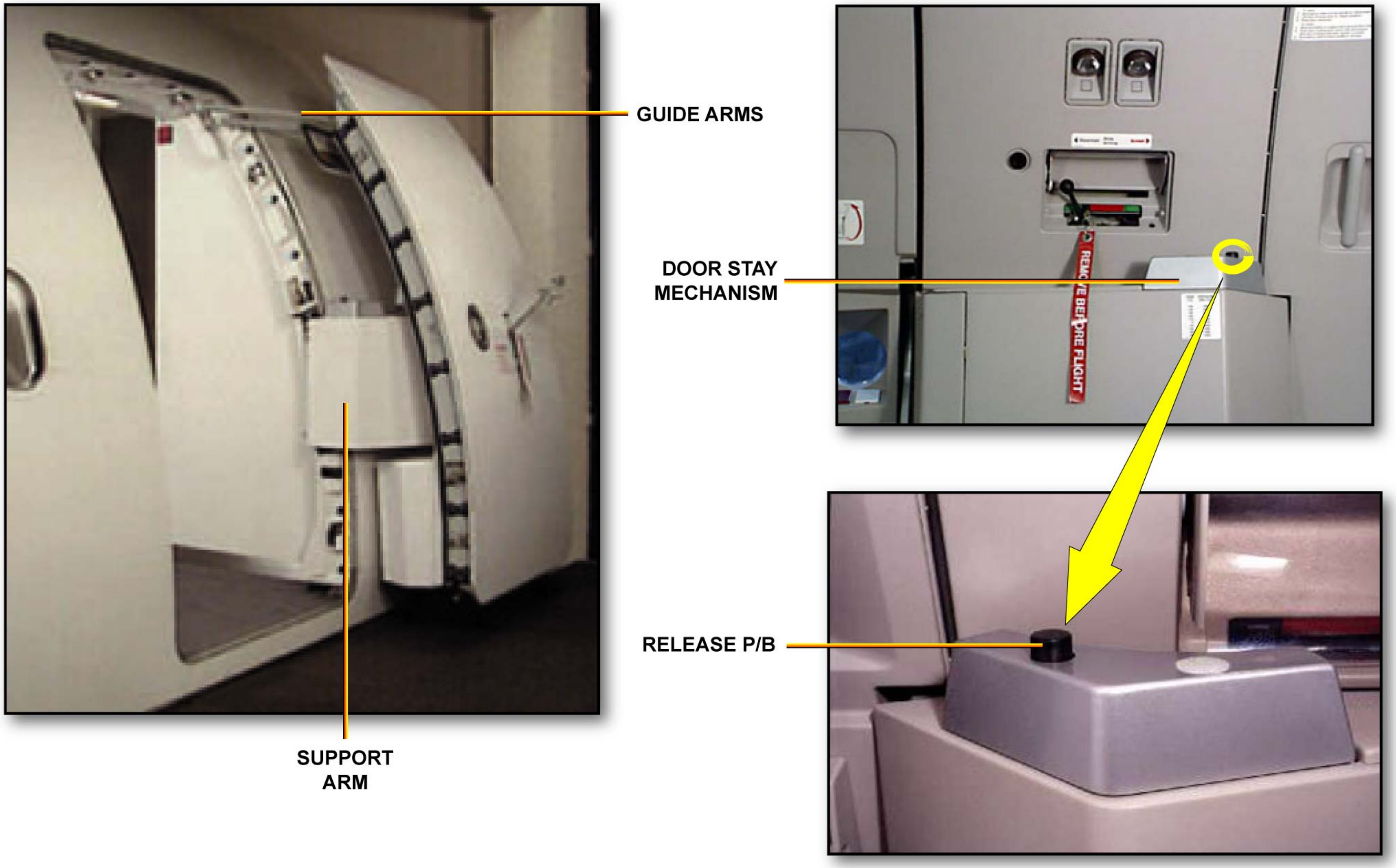
G6B08031 - G10T4T0 - FM52P7000000001

52 DOORS SYSTEM PRESENTATION (1)

PASSENGER AND EMERGENCY DOORS (continued)

PASSENGER/EMERGENCY DOORS ATTACHMENTS

The support arm supports the door load. Two guide arms maintain the door parallel to the fuselage. To prevent the door from moving when it is in the fully open position, the door stay mechanism locks the door. It is released by a P/B installed on the support arm.



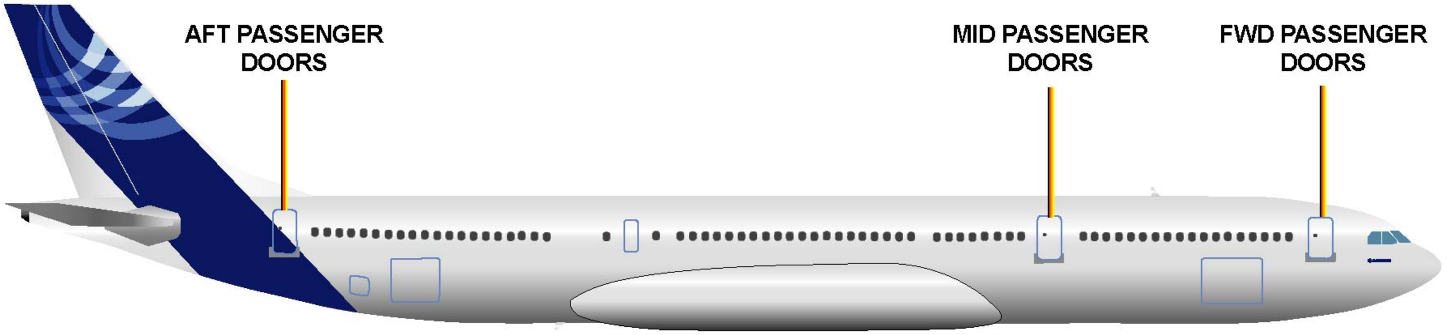
PASSENGER AND EMERGENCY DOORS - PASSENGER/EMERGENCY DOORS ATTACHMENTS

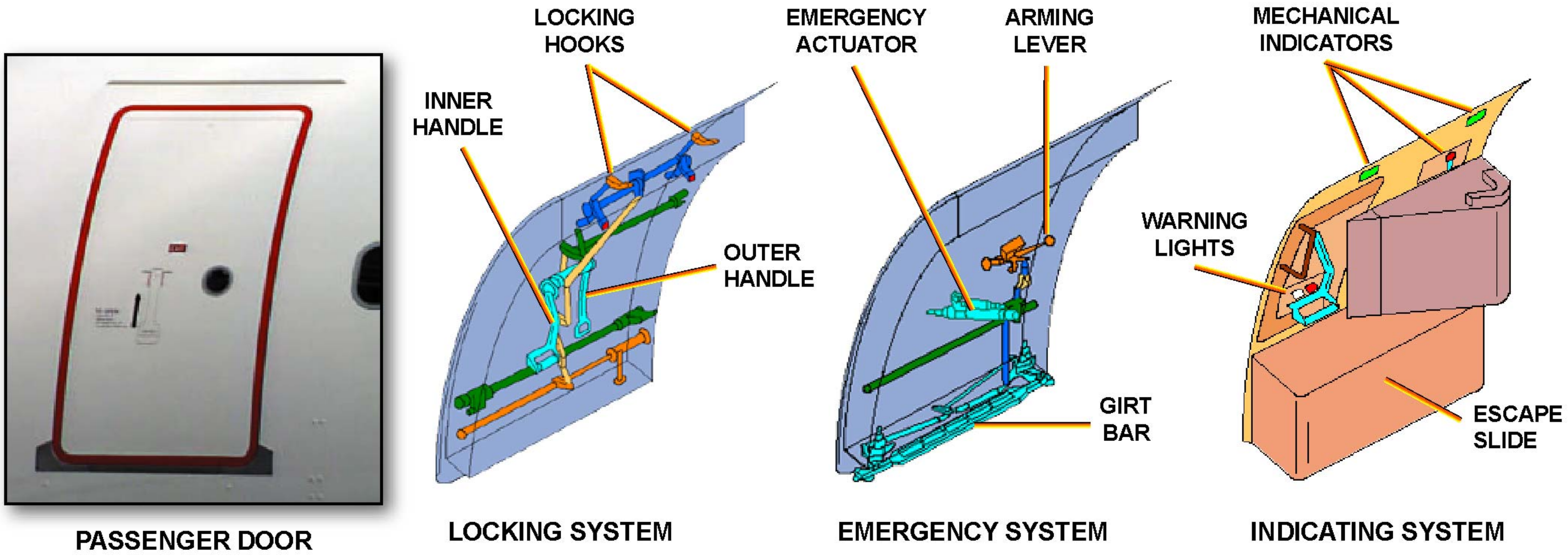
52 DOORS SYSTEM PRESENTATION (1)

PASSENGER AND EMERGENCY DOORS (continued)

PASSENGER AND EMERGENCY DOORS STRUCTURE AND MECHANISMS

All the passenger/crew doors have similar structure and mechanisms. There are six passenger/crew doors, three on each side of the cabin. There are two FWD, two middle and two aft doors. All the passenger/crew doors whatever the aircraft, have a locking system, an emergency system and an indicating system. Each passenger/crew door has an escape slide which is kept in a container in the lower part of the door.





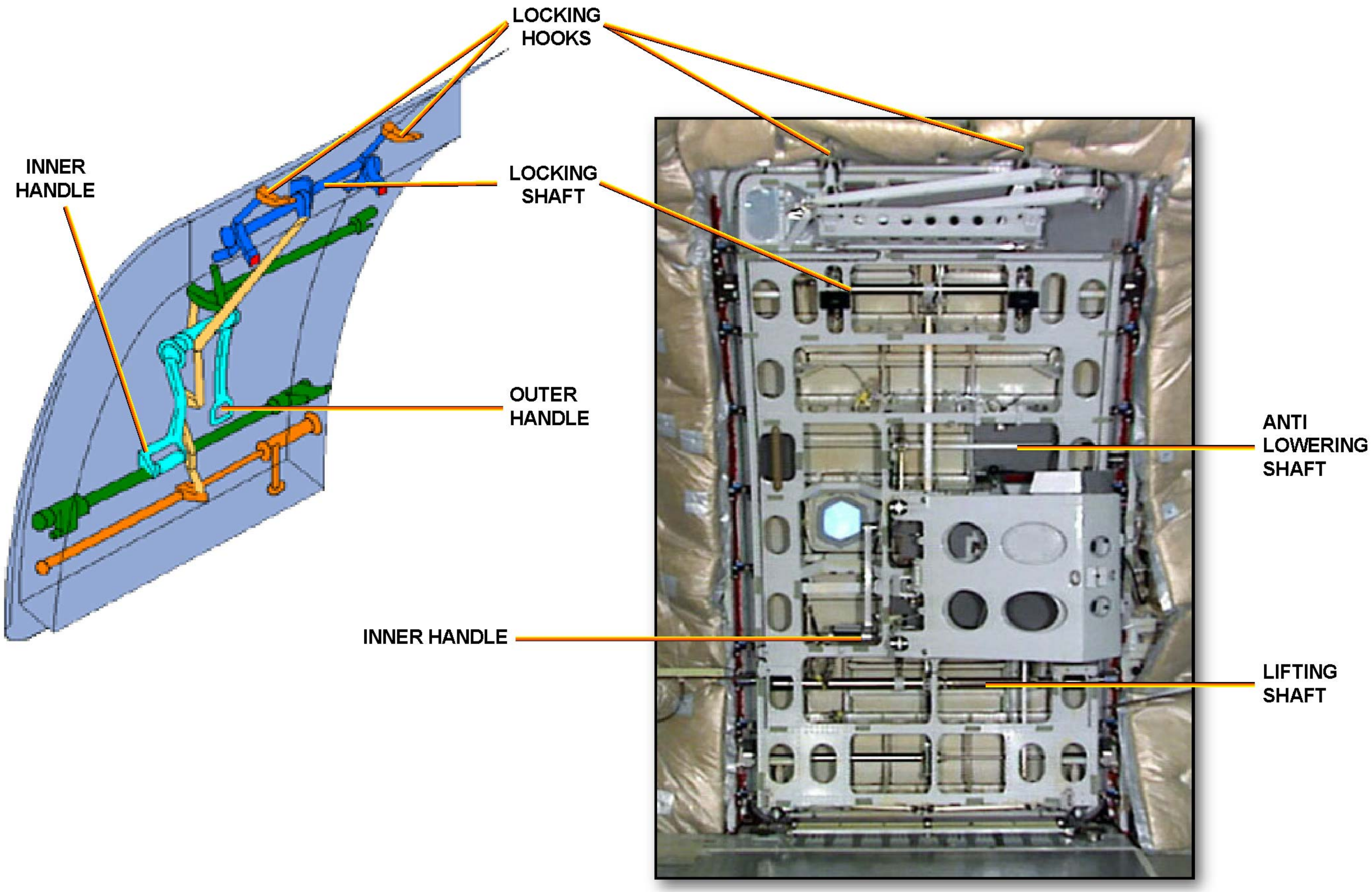
PASSENGER AND EMERGENCY DOORS - PASSENGER AND EMERGENCY DOORS STRUCTURE AND MECHANISMS

52 DOORS SYSTEM PRESENTATION (1)

PASSENGER AND EMERGENCY DOORS (continued)

PASSENGER AND EMERGENCY DOORS LOCKING SYSTEM

Door locking/unlocking can be executed either from the inner handle or the outer handle. Both handles operate a mechanical linkage to help all the door movements: lowering, lifting and outward opening. The locking is done by two locking hooks located on the upper edge and a locking shaft.



G6B08031 - G10T4T0 - FM52P7000000001

PASSENGER AND EMERGENCY DOORS - PASSENGER AND EMERGENCY DOORS LOCKING SYSTEM

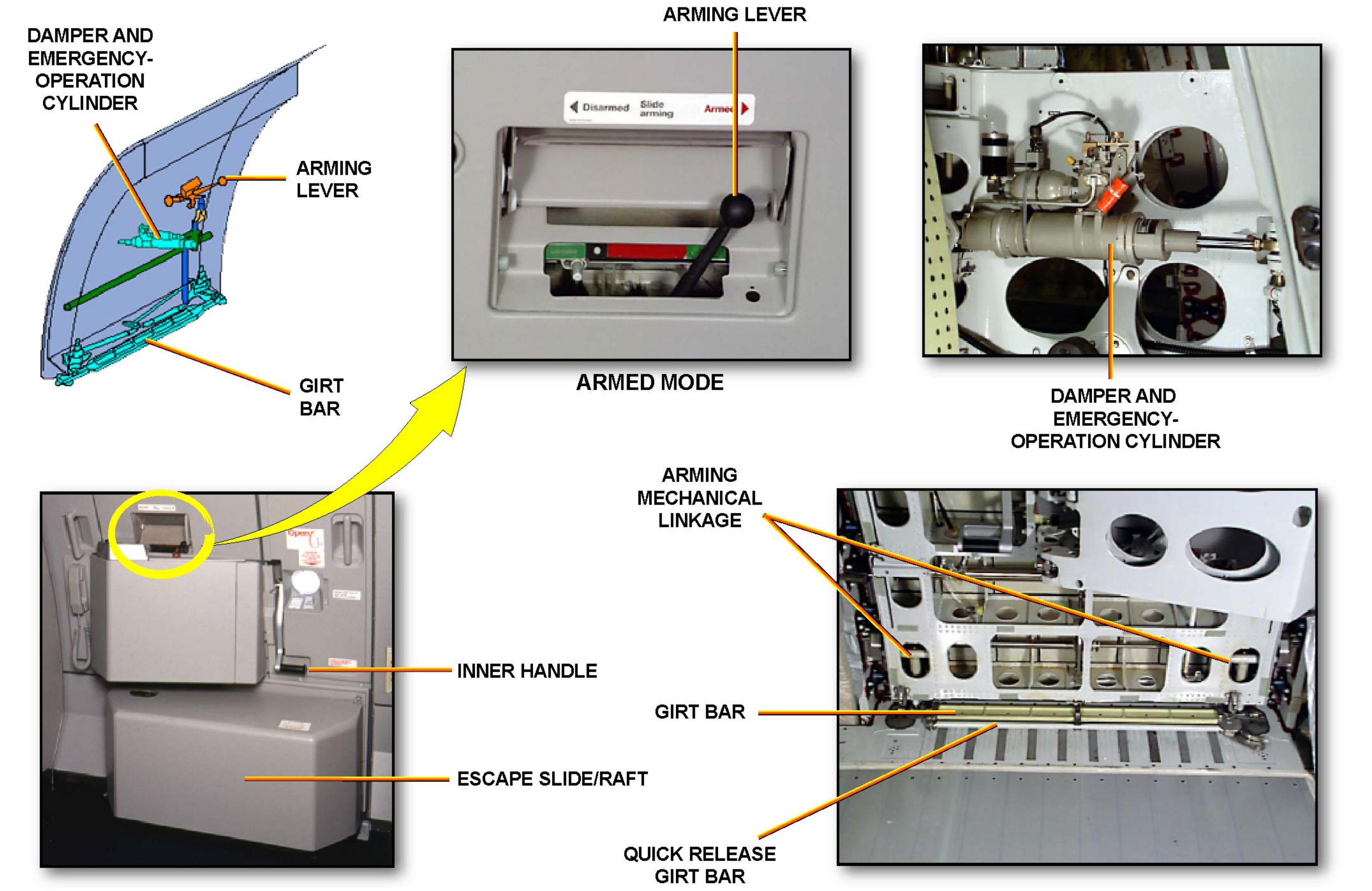
52 DOORS SYSTEM PRESENTATION (1)

PASSENGER AND EMERGENCY DOORS (continued)

PASSENGER AND EMERGENCY DOORS EMERGENCY SYSTEM

The emergency system has:
- an arming lever controlling the girt bar,
- a damper and emergency-operation cylinder,
- an escape slide/raft packed into a container installed at the bottom of the door.

Disarmed mode selected, the mechanical linkage secures the girt bar to the door. The damper and emergency-operation cylinder damps the door movement. Armed mode selected, the arming mechanical linkage attaches the girt bar to the structure in order to deploy the escape slide/raft during the opening. The damper and emergency-operation cylinder opens the door automatically when the handle is raised to let the escape slide/raft deploy in armed mode.



PASSENGER AND EMERGENCY DOORS - PASSENGER AND EMERGENCY DOORS EMERGENCY SYSTEM

52 DOORS SYSTEM PRESENTATION (1)

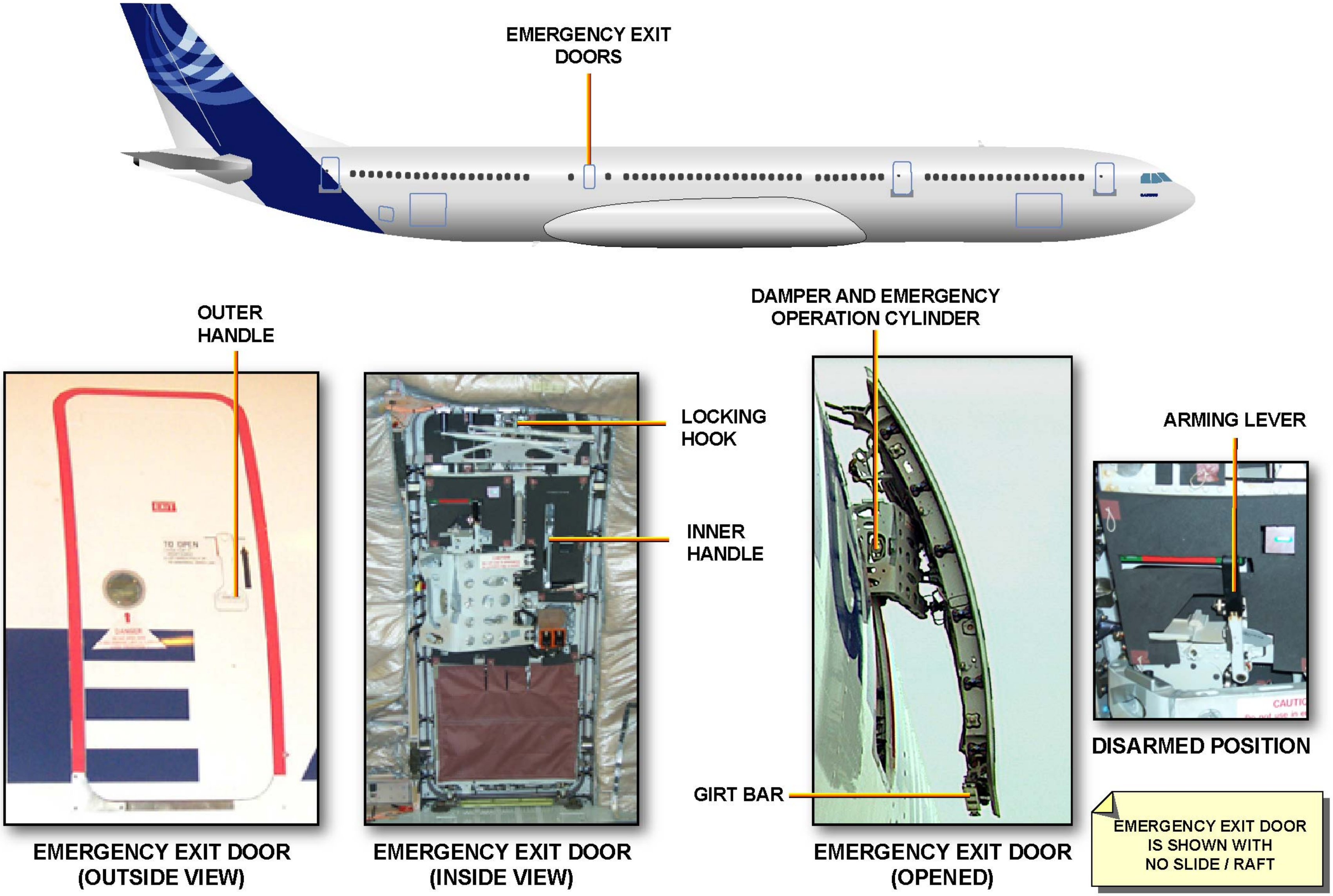
PASSENGER AND EMERGENCY DOORS (continued)

EMERGENCY EXITS

Emergency exit doors are of the type I and similar to the type A doors in function but not in design. They are smaller, but still have a locking system, an emergency system and an indicating system. The structure and the attachments are similar to the passenger/crew door.
Door locking/unlocking is initiated either from the outer handle or the inner handle. Only one locking hook is operated. It is the same type of mechanical linkage as the type A passenger doors.
The emergency system has an arming lever operating a girt via a mechanical linkage.

NOTE: The escape slide/raft is packed into a container installed at the bottom of the door.

The damper and emergency-operation cylinder work also as a damper in disarmed mode or as an emergency-operation cylinder in armed mode.



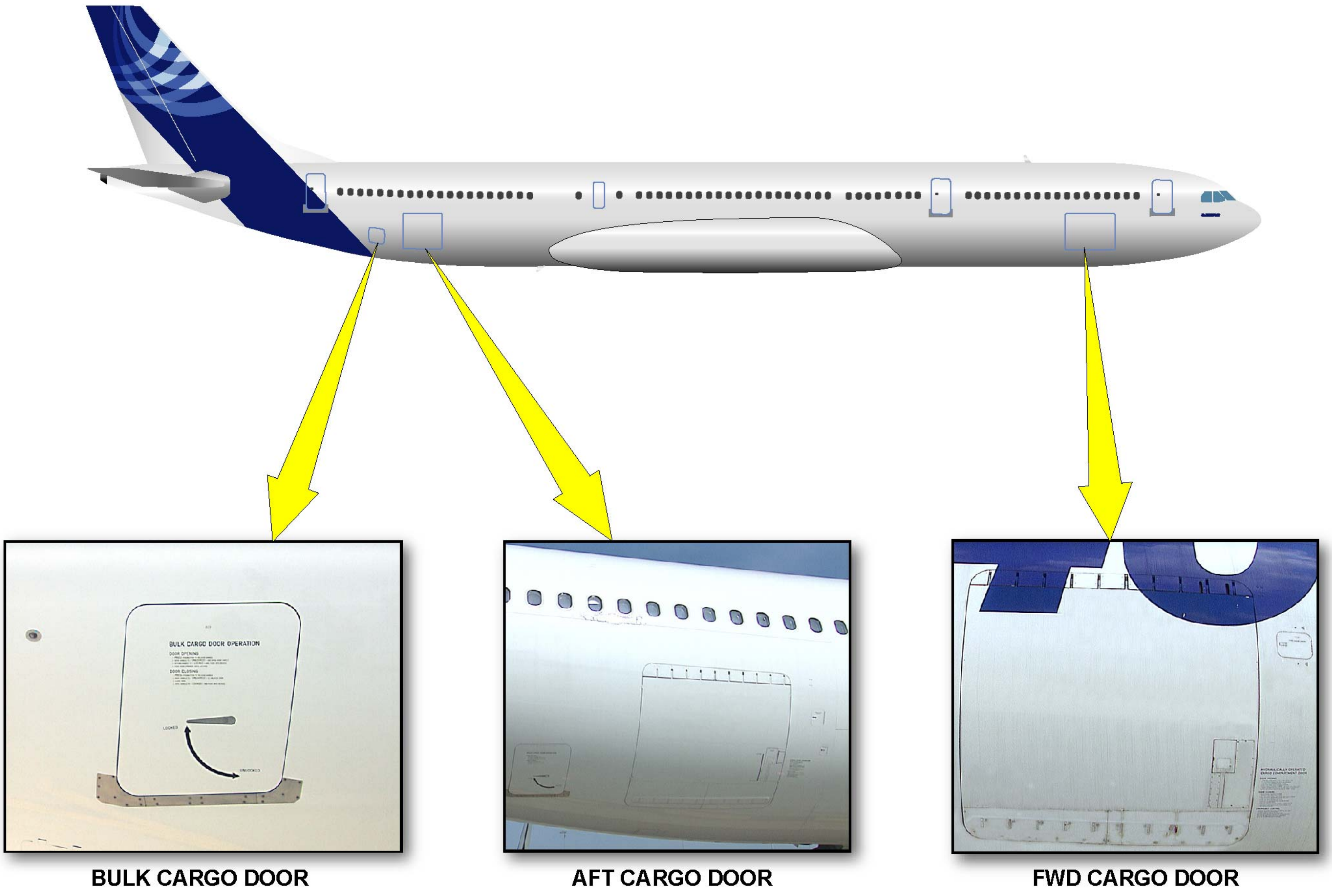
PASSENGER AND EMERGENCY DOORS - EMERGENCY EXITS

G6B08031 - G10T4T0 - FM52P7000000001

52 DOORS SYSTEM PRESENTATION (1)

CARGO DOORS

The aircraft has three cargo compartment doors installed on the lower right hand side of the fuselage. The three doors give access to the cargo compartments:
- the FWD and aft doors are hydraulically operated,
- the bulk cargo door is manually operated.



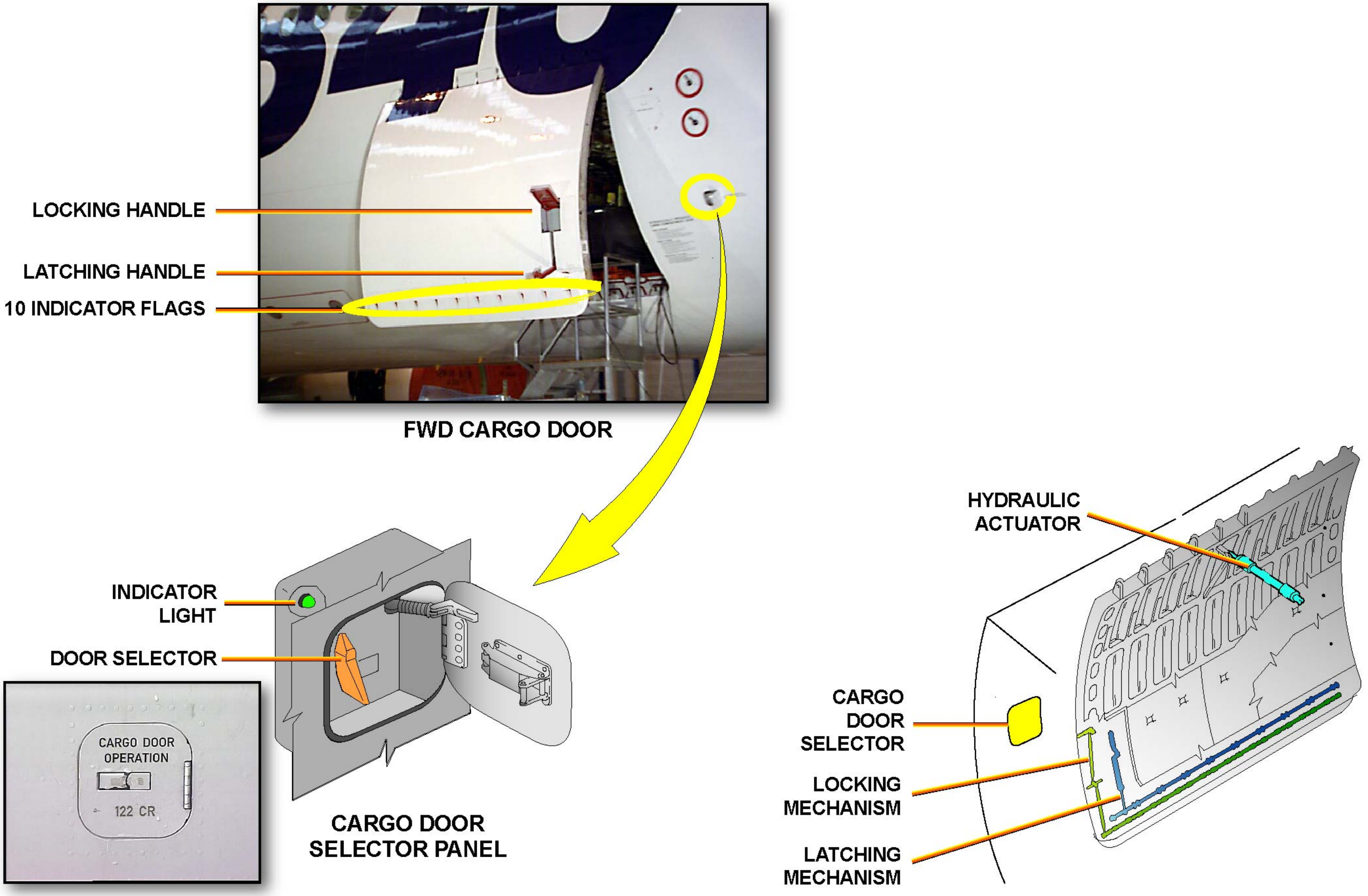
CARGO DOORS

52 DOORS SYSTEM PRESENTATION (1)

CARGO DOORS (continued)

CARGO DOORS GENERAL

The FWD and aft cargo doors open outwards and upwards from the fuselage and are manually locked/unlocked and hydraulically operated.
The door system comprises:
- a cargo door selector to select the opening or closing of the door,
- a green indicator light to indicate that the door is fully open and locked,
- a hydraulic actuator to open and close the door and to lock it mechanically when the door is fully open,
- a locking handle to lock the door when the door is fully closed,
- a latching handle to control latching/unlatching of the door in the fuselage,
- 10 indicator flags to indicate the correct locking of the door.



CARGO DOORS - CARGO DOORS GENERAL

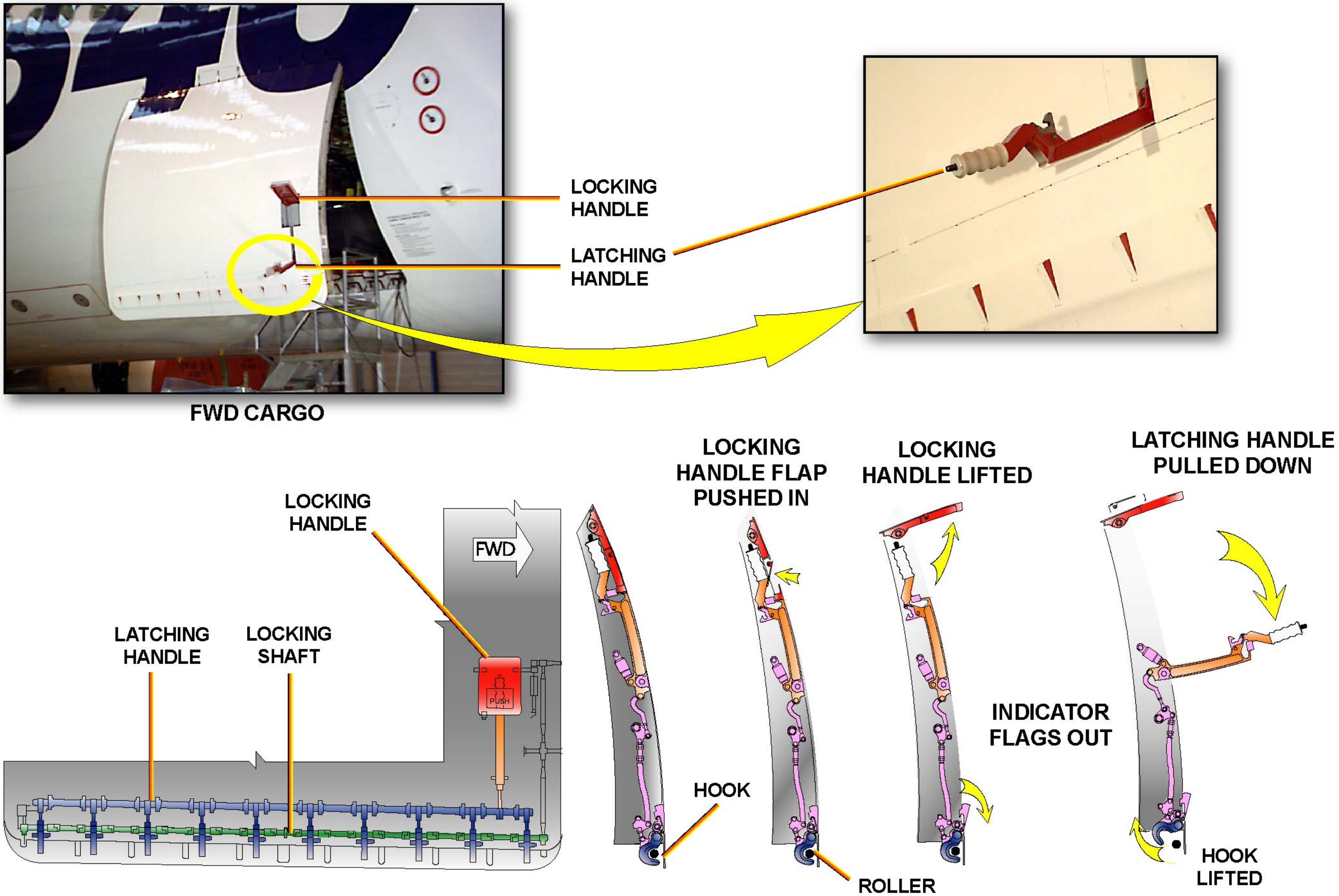
52 DOORS SYSTEM PRESENTATION (1)

CARGO DOORS (continued)

CARGO DOORS LOCKING AND LATCHING

The door has:
- a locking handle,
- a latching handle.

The locking handle is used for the safety by securing the hooks in the latched position. It operates a locking shaft, which secures the latching shaft, when the hooks are engaged with the rollers. When the locking handle is in the unlocked position it gives access to the latching handle. Indicator flags extrude from the door skin if the locking system is not in the fully locked position. A catch pin safeties the latching handle in the fully latched position. A P/B on the latching handle must be pressed to release the catch. The cargo door will then leave the fuselage frame under gravity.



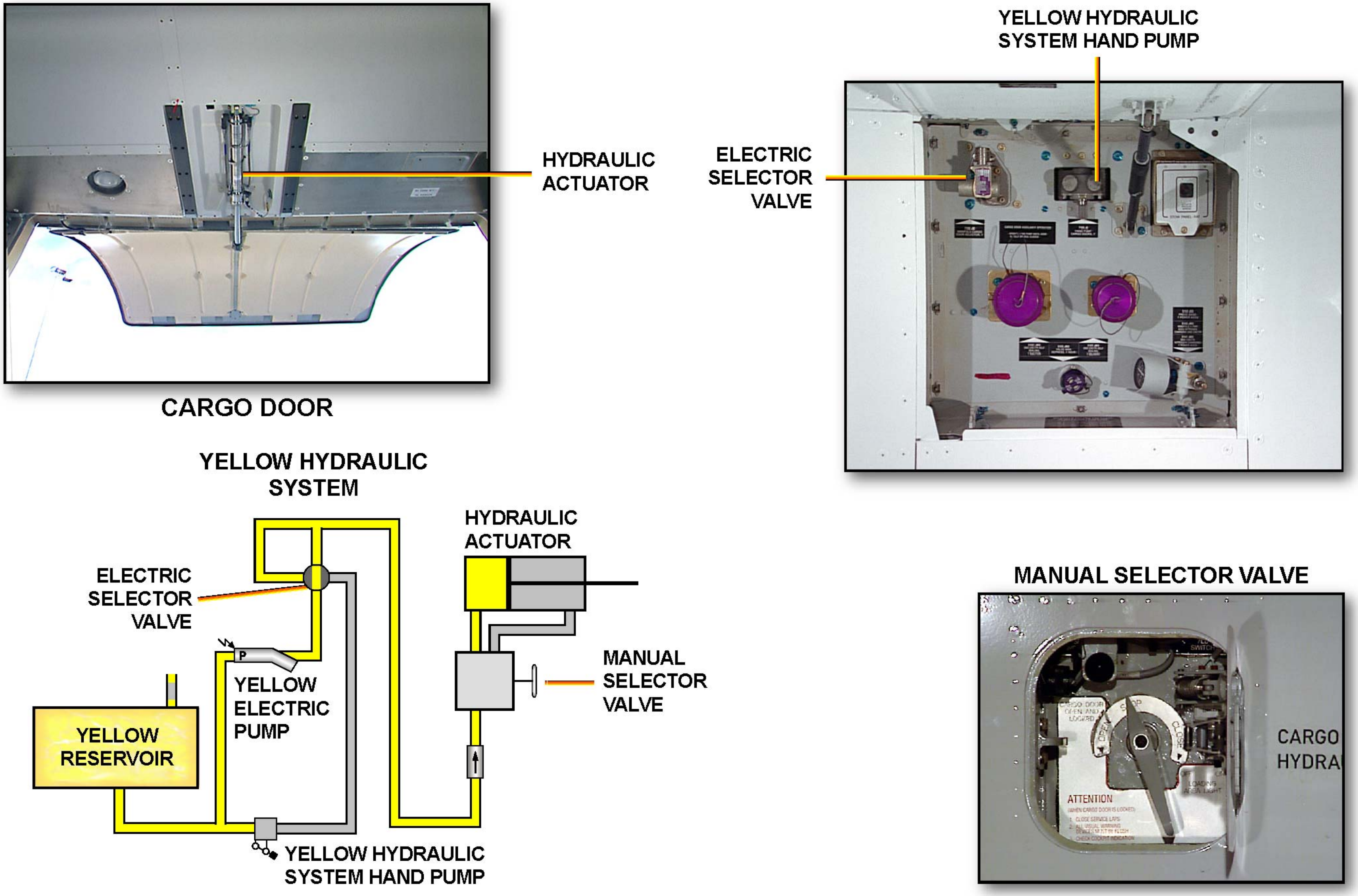
CARGO DOORS - CARGO DOORS LOCKING AND LATCHING

52 DOORS SYSTEM PRESENTATION (1)

CARGO DOORS (continued)

CARGO DOORS HYDRAULIC OPERATION

The cargo compartment door hydraulic system controls the operation of the FWD and aft cargo compartment doors. The hydraulic system of each door has a hydraulic actuator and a manual selector valve. The yellow auxiliary hydraulic system supplies the doors with hydraulic pressure. For normal operation the yellow electric pump is used. For the case of electric pump failure or no electric power on the aircraft a hand pump can be used. A single operator achieves normal operation; two operators are needed for manual operation. Turning the manual selector lever to open or close is necessary in both operating modes. Turning the manual selector lever and the normal system available will start up the electric pump and the door will move.



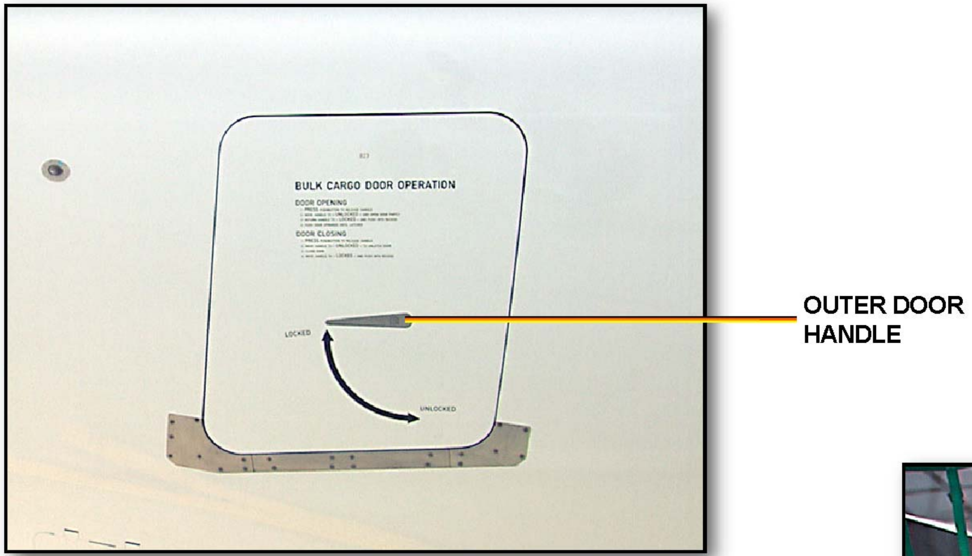
CARGO DOORS - CARGO DOORS HYDRAULIC OPERATION

52 DOORS SYSTEM PRESENTATION (1)

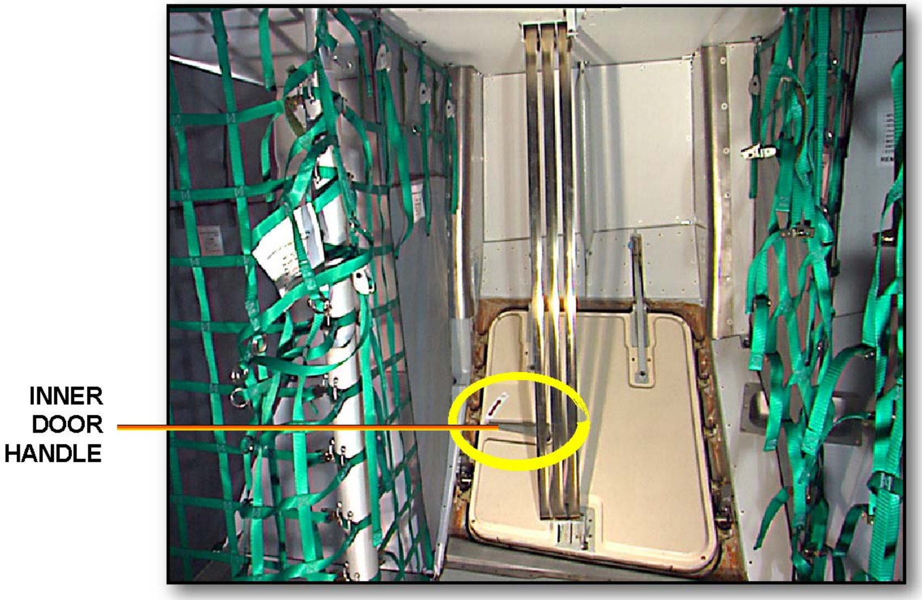
CARGO DOORS (continued)

BULK CARGO DOOR

The bulk cargo door opens upwards and inwards and it is manually operated from the inside or the outside of the aircraft.



BULK CARGO FROM THE OUTSIDE



BULK CARGO FROM THE INSIDE

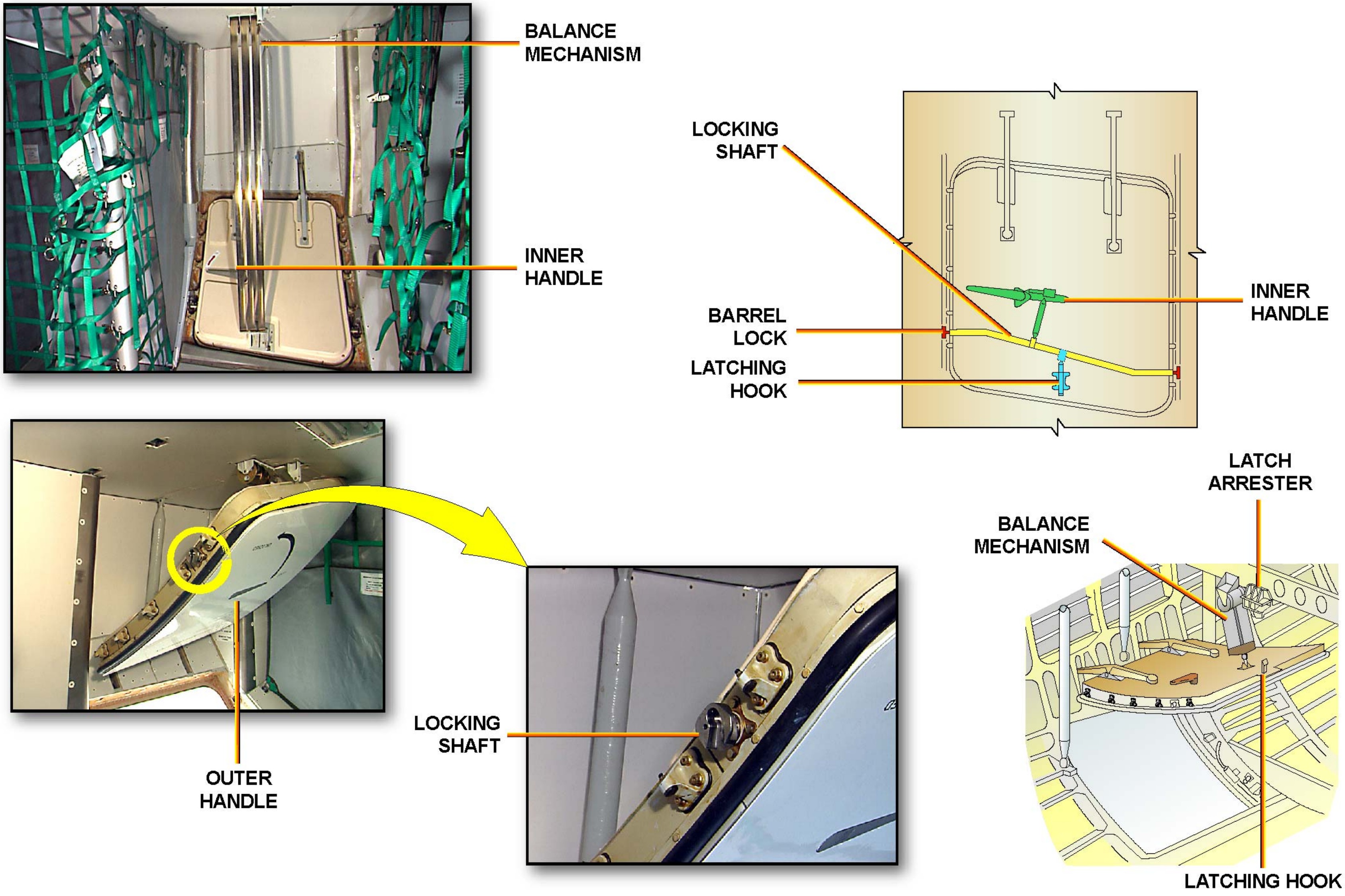
CARGO DOORS - BULK CARGO DOOR

52 DOORS SYSTEM PRESENTATION (1)

CARGO DOORS (continued)

BULK CARGO DOOR LOCKING AND LATCHING

The bulk cargo door has an inner and an outer handle, which operate the locking mechanism. There is a barrel lock installed at each end of the locking shaft to lock the door in the fuselage. A balance mechanism reduces the force, which is necessary to open the door. There is a latch assembly, which holds it in the fully open position. The locking system operates also the latching hook. To lock the latching hook in the latch arrester it is necessary to put the door control handles to the closed position.



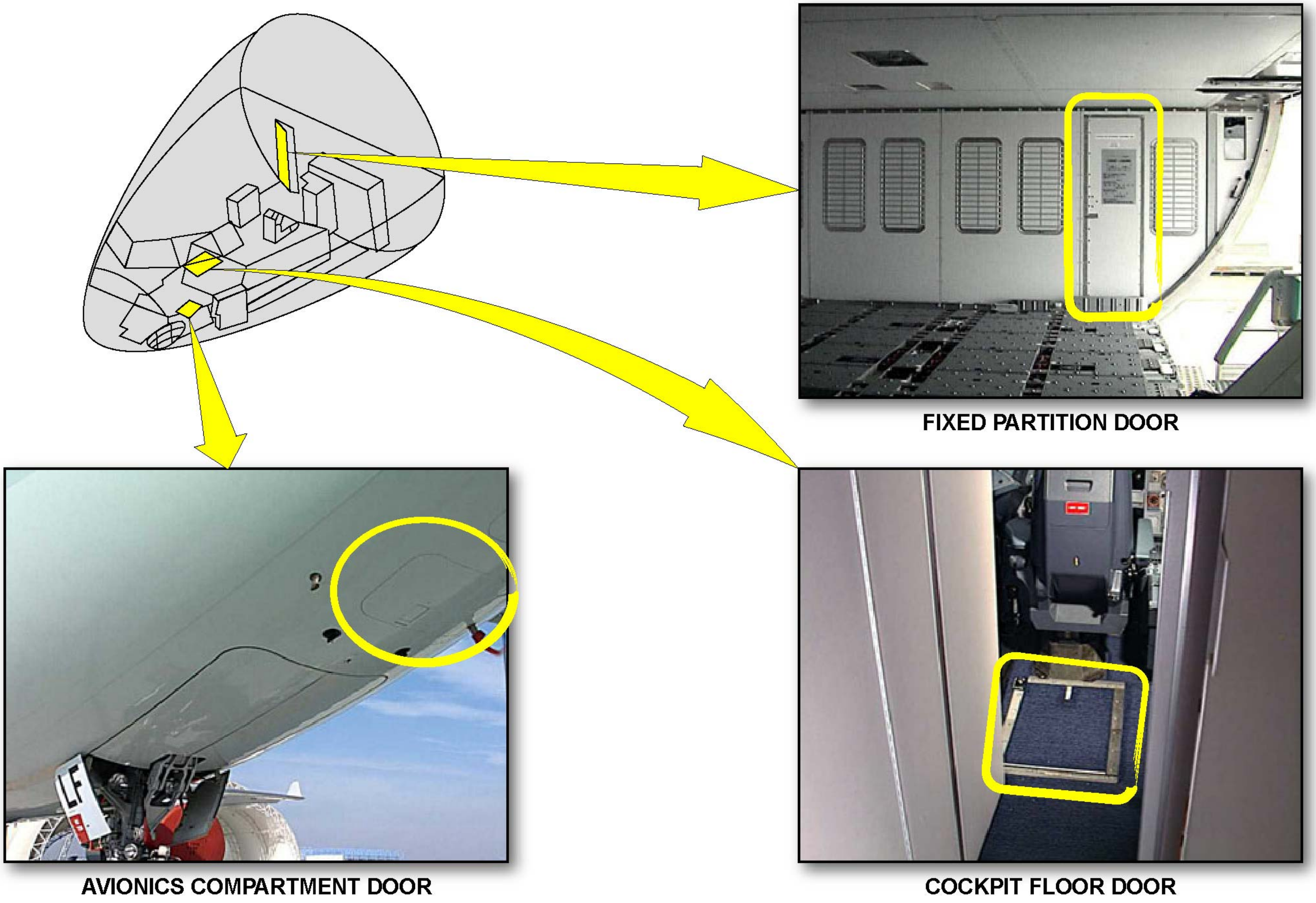
CARGO DOORS - BULK CARGO DOOR LOCKING AND LATCHING

G6B08031 - G10T4T0 - FM52P7000000001

52 DOORS SYSTEM PRESENTATION (1)

AVIONICS COMPARTMENT DOORS

The avionics compartment has two doors, and one cockpit floor door:
- the avionics compartment door located at the FWD bottom of the fuselage,
- the fixed partition door located between the FWD cargo compartment and the avionics compartment,
- the cockpit floor door located between the cockpit and the avionics compartment.



AVIONICS COMPARTMENT DOORS

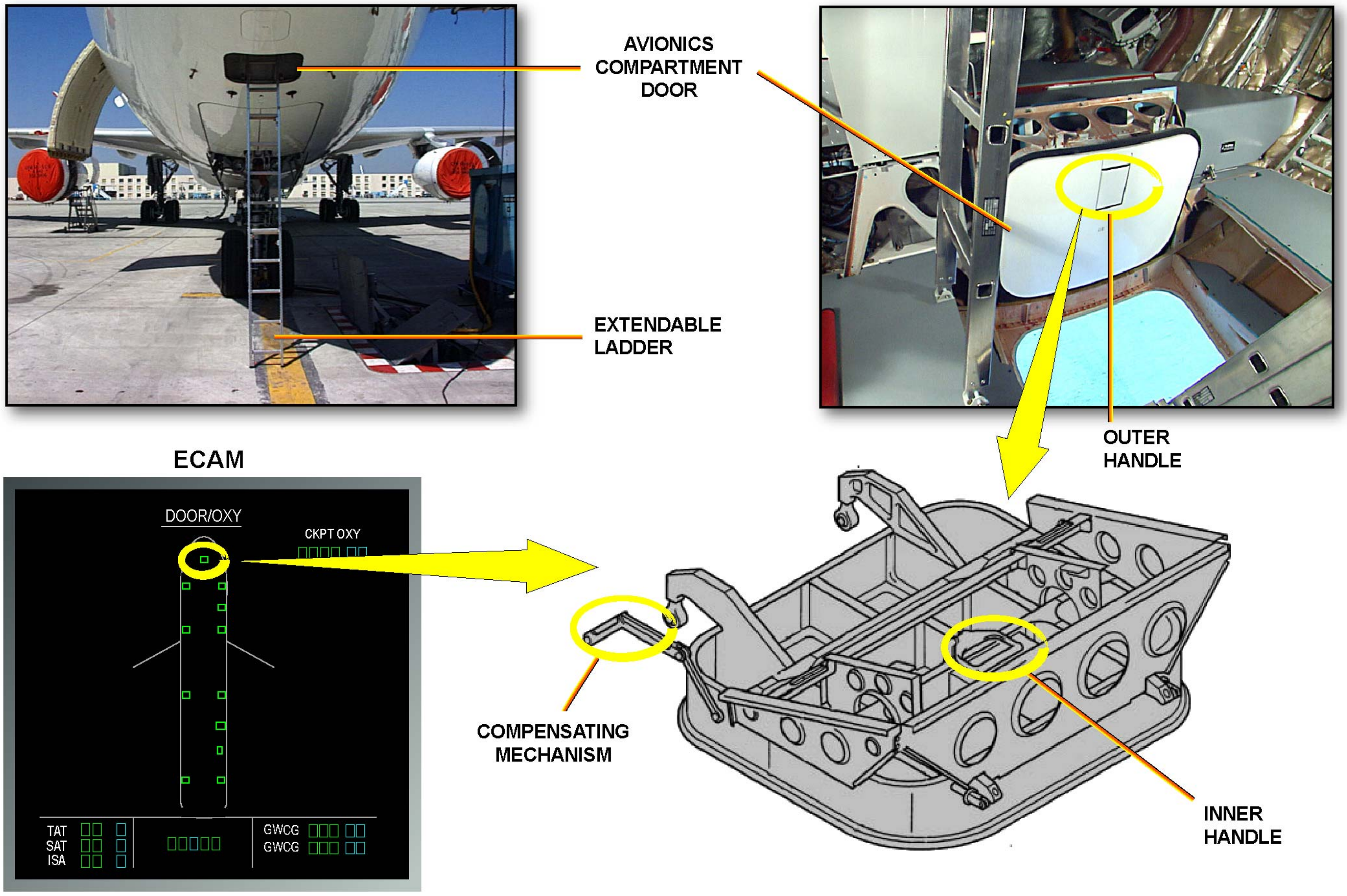
G6B08031 - G10T4T0 - FM52P7000000001

52 DOORS SYSTEM PRESENTATION (1)

AVIONICS COMPARTMENT DOORS (continued)

AVIONICS COMPARTMENT DOORS BOTTOM FUSELAGE

The avionics compartment door is installed in the FWD bottom part of the fuselage in the pressured area of the aircraft. The door indicating and warning system sends a signal to the ECAM DOOR/OXY page, which indicates the state of the avionics access door. The avionics compartment door gives access to the aircraft through an extendable ladder. The door can be opened from the outside or from the inside of the fuselage with outer and inner handles. A compensating mechanism reduces the force that is necessary to operate the door.



AVIONICS COMPARTMENT DOORS - AVIONICS COMPARTMENT DOORS BOTTOM FUSELAGE

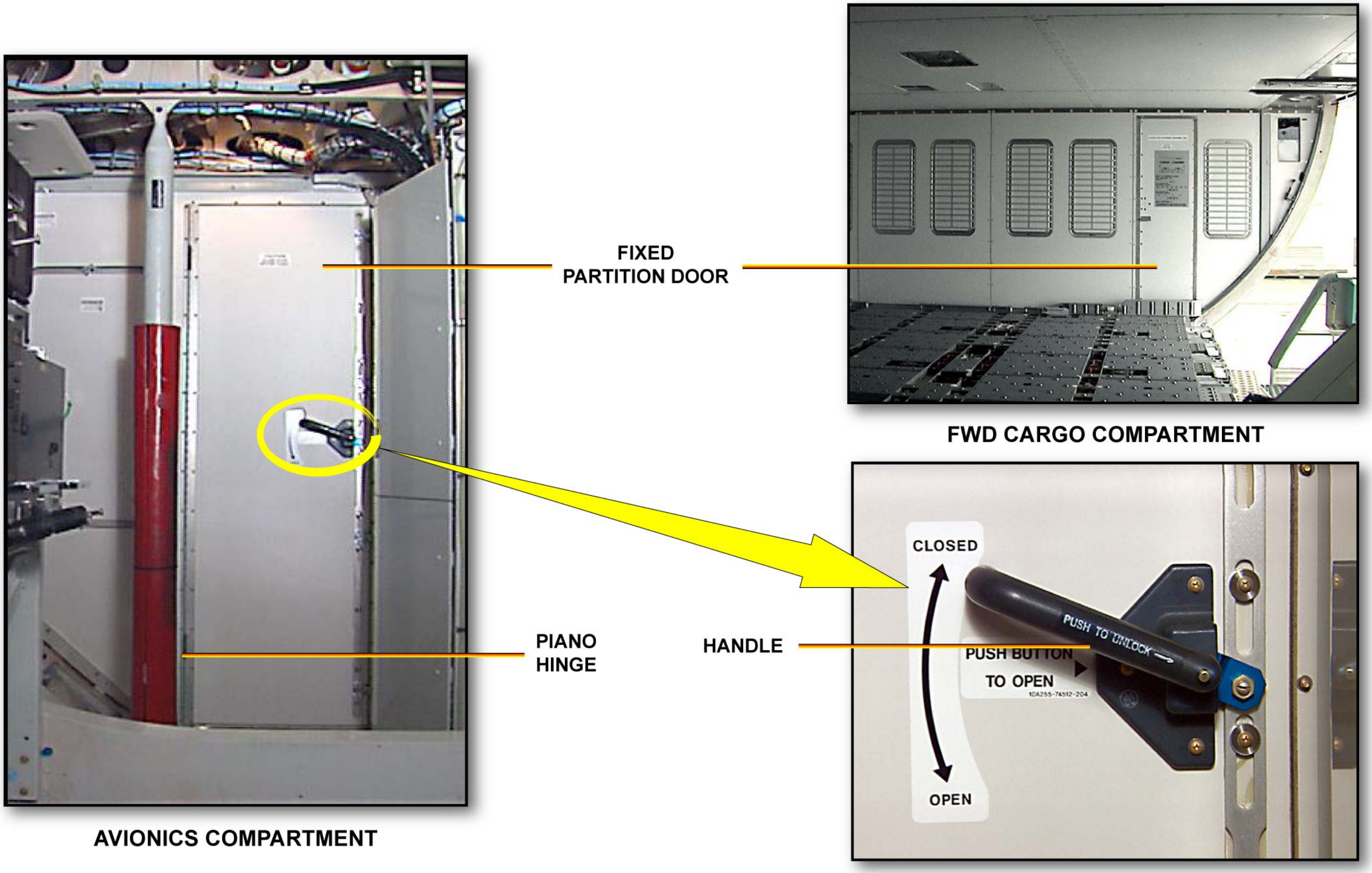
G6B08031 - G10T4T0 - FM52P7000000001

52 DOORS SYSTEM PRESENTATION (1)

AVIONICS COMPARTMENT DOORS (continued)

AVIONICS COMPARTMENT DOORS FIXED PARTITION

The fixed partition door gives access to the avionics compartment from the FWD cargo compartment. A piano hinge attaches the door to the fixed partition. The door opens into the avionics compartment. A handle is located on the avionics compartment side only. A special key (in the onboard tool kit) opens the door from inside the cargo compartment.



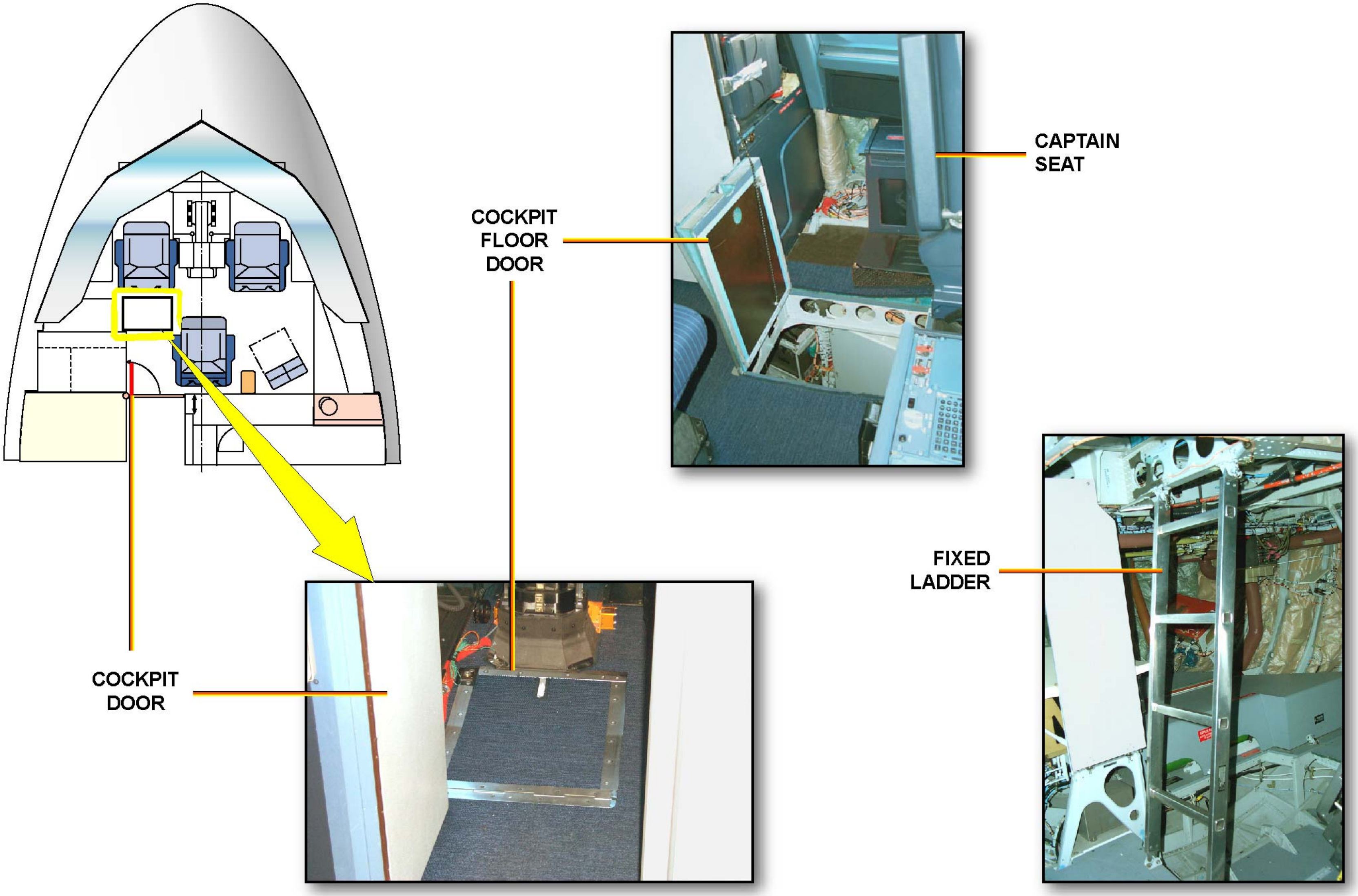
AVIONICS COMPARTMENT DOORS - AVIONICS COMPARTMENT DOORS FIXED PARTITION

52 DOORS SYSTEM PRESENTATION (1)

AVIONICS COMPARTMENT DOORS (continued)

AVIONICS COMPARTMENT DOORS COCKPIT

The cockpit floor door gives access to the avionics compartment from the cockpit. It is located between the rear of the captain seat and the cockpit door. It can be opened from both sides and an attached ladder gives access to the users into the avionics compartment.

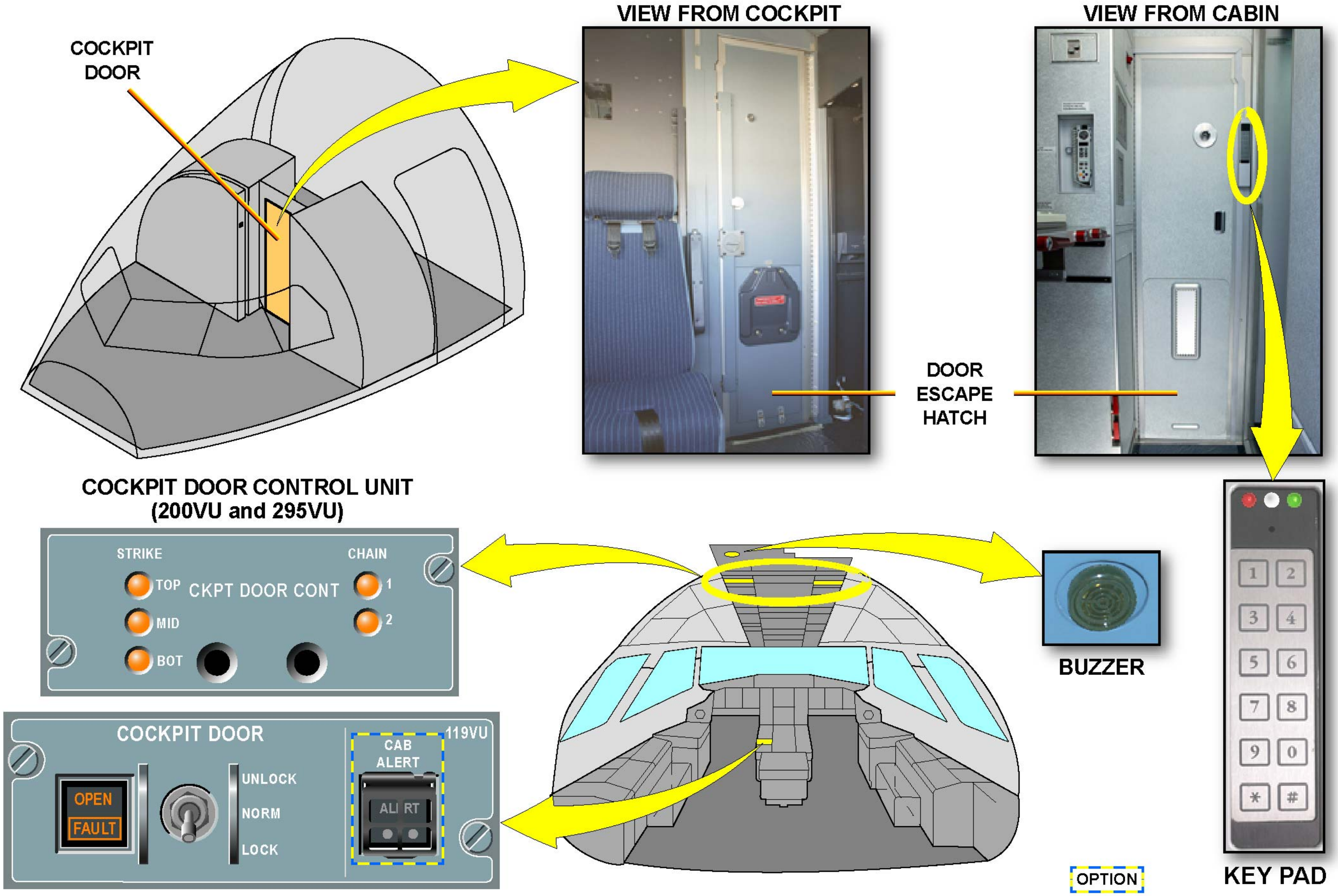


AVIONICS COMPARTMENT DOORS - AVIONICS COMPARTMENT DOORS COCKPIT

52 DOORS SYSTEM PRESENTATION (1)

COCKPIT DOOR

The cockpit door separates the cockpit from the cabin. It is an armored and bulletproof door made to prevent a hijacking attempt and protect the flight compartment against an intrusion. A Cockpit Door Locking System (CDLS) controls its electrical release and prevents an unwanted access into the cockpit. The door also has a door escape hatch with a pneumatically operated decompression panel, which opens the hatch when there is a rapid decompression between the cockpit and the cabin.



COCKPIT DOOR

52 DOORS SYSTEM PRESENTATION (1)

COCKPIT DOOR (continued)

COCKPIT DOOR LOCK SYSTEM (CDLS)

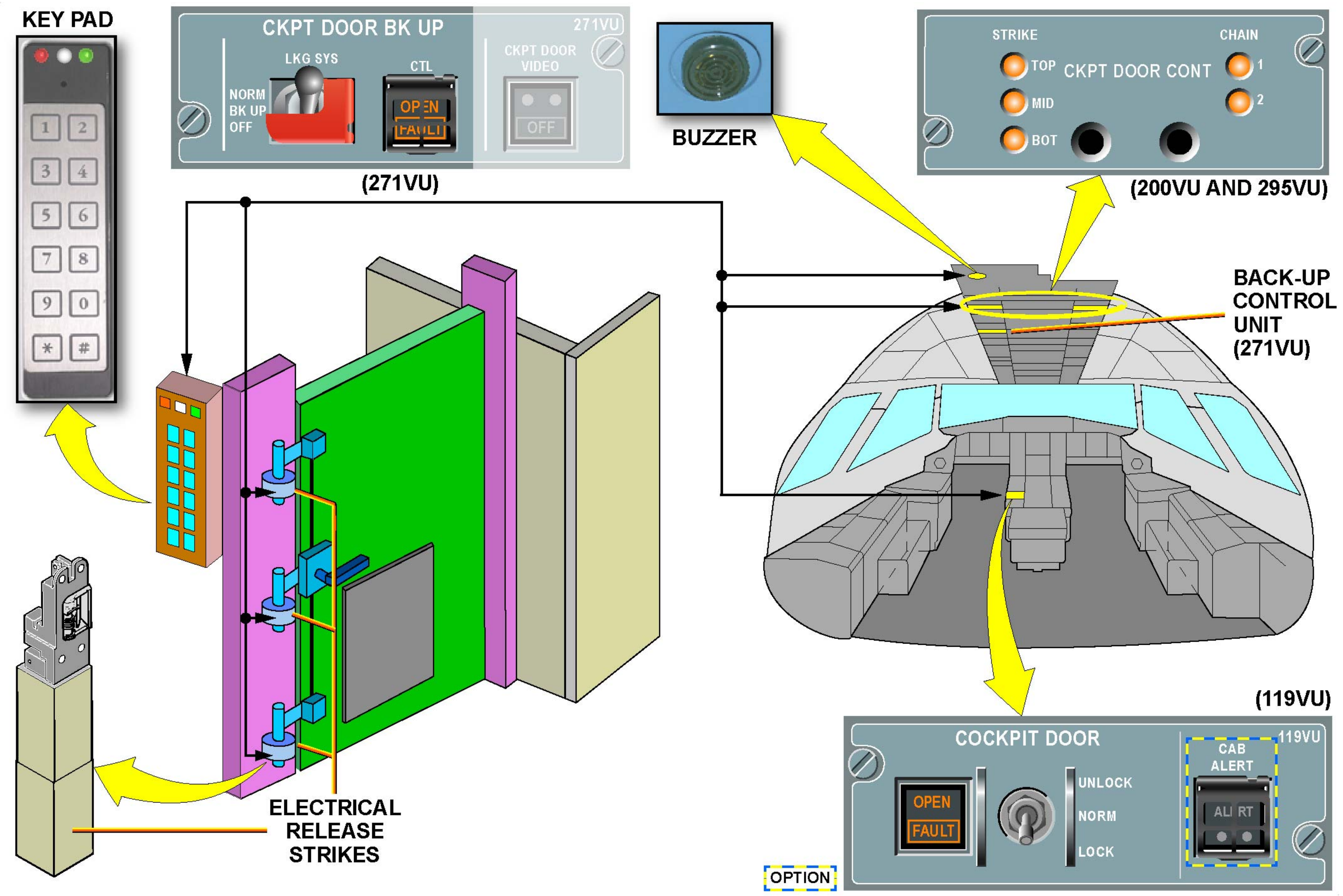
The CDLS is an electrically operating system for the locking and unlocking of the cockpit door.
This system is mainly composed of:
- a control unit and its CocKPiT DOOR CONTrol panel, located on the left-hand side of the overhead panel and a control unit, identical to the first one, and its CKPT DOOR CONT panel, located on the right-hand side of the overhead panel,
- the CKPT DOOR panel on the center pedestal with a toggle switch to control the cockpit door and a fault indicator,

NOTE: The CKPT DOOR panel can be equipped in option with a CAB ALERT guarded P/B, which alert CKPT crew in case of hijacking/vandalism in cabin.

- the buzzer on the overhead panel,
- the keypad in the cabin for cockpit access authorization,
- three electrical release strikes,
- an additional CKPT DOOR BacK-UP panel, which is composed of a LocKinG SYStem switch and a OPEN/FAULT ConTroL P/B

NOTE: The door is always locked when closed and the aircraft is powered during maintenance activity there is a magnetic door stop to keep the door fully open.

G6B08031 - G10T4T0 - FM52P7000000001



COCKPIT DOOR - COCKPIT DOOR LOCK SYSTEM (CDLS)

G6B08031 - G10T4T0 - FM52P7000000001

52 DOORS SYSTEM PRESENTATION (1)

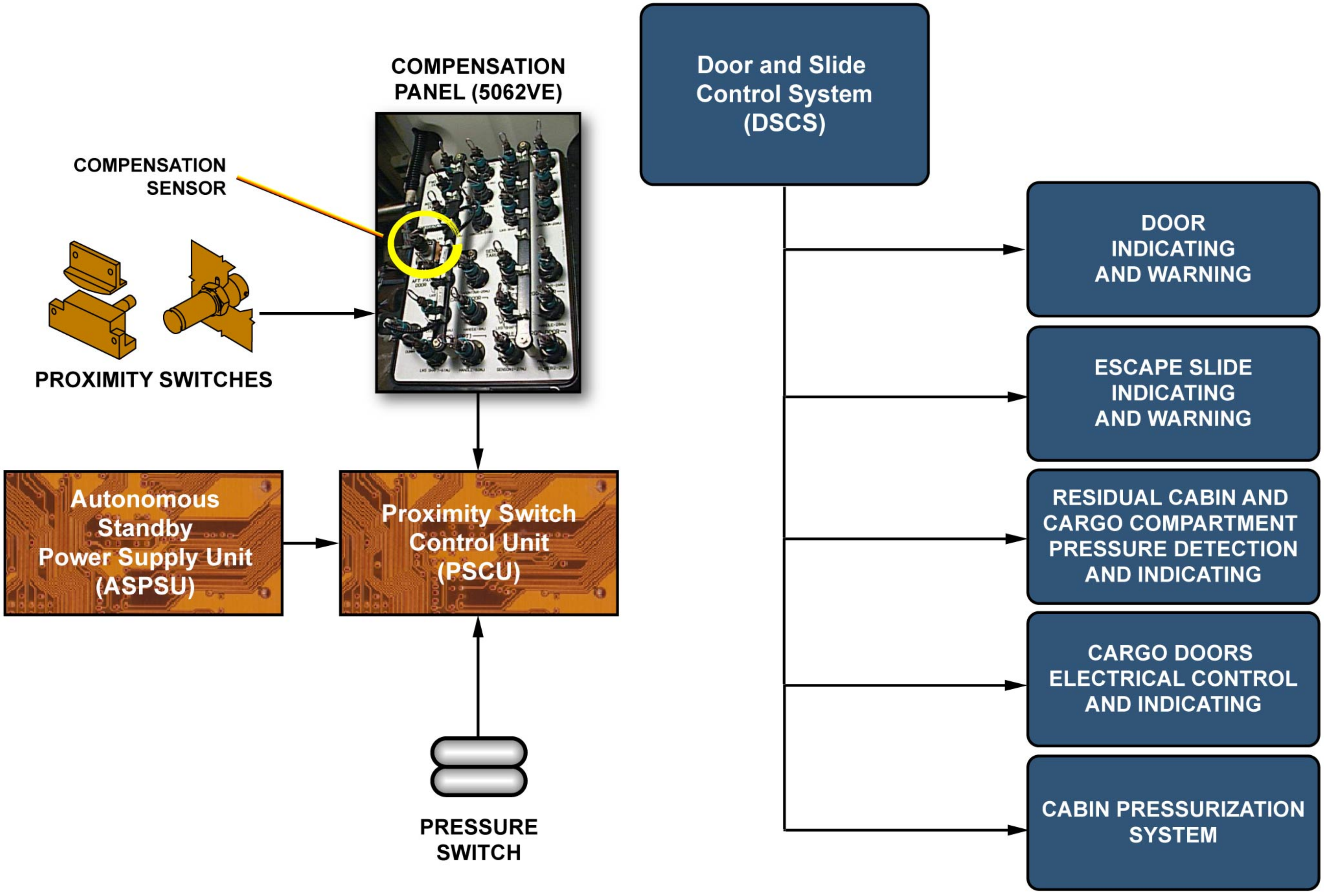
DOORS AND ESCAPE SLIDES CONTROL SYSTEM (DSCS)

The DSCS gives electrical indications related to the condition of the doors. The DSCS has:
- proximity switches,
- a compensation panel (5062VE),
- a Proximity Switch Control Unit (PSCU),
- an Autonomous Standby Power Supply Unit (ASPSU),
- a pressure switch.

The primary functions of the DSCS are to control:
- door indicating and warning,
- escape slide indicating and warning,
- the residual cabin and cargo compartment pressure detection and indicating,
- cargo doors electrical control and indicating.

On the ground, with one engine running, the DSCS prevents the pressurization of the aircraft if:
- a door is not fully closed and locked,
- a sensor is defective.

If a proximity sensor fails during the flight, the aircraft will stay pressurized.
The compensation panel has one compensation sensor with a set target. This compensation sensor can be used for a manual override function when a door closed proximity sensor failed. This function lets dispatch the aircraft using the Minimum Equipment List (MEL) procedure.



DOORS AND ESCAPE SLIDES CONTROL SYSTEM (DSCS)

G6B08031 - G10T4T0 - FM52P7000000001

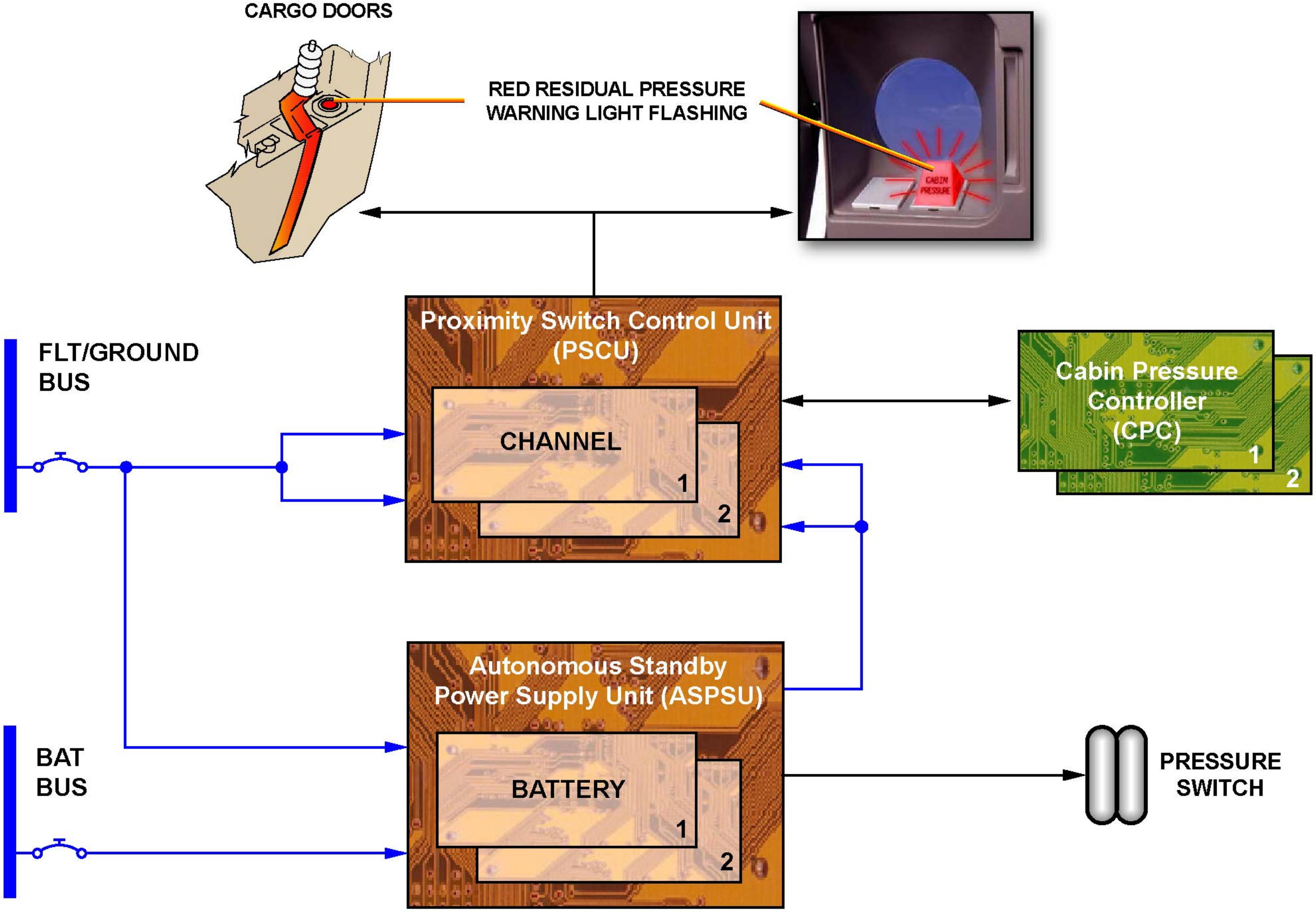
52 DOORS SYSTEM PRESENTATION (1)

DOORS AND ESCAPE SLIDES CONTROL SYSTEM (DSCS) (continued)

PROXIMITY SWITCH CONTROL UNIT (PSCU)

The PSCU has two independent channels supplied by two independent 28V DC busbars:
- the Flight/Ground bus bar,
- the battery bus bar via the ASPSU.

When all doors are closed and locked, the PSCU sends signals to the Cabin Pressure Controllers (CPCs) so that the cabin can be pressurized.
The ASPSU supplies power for the residual pressure warning system through the PSCU on a de-powered aircraft. The ASPSU has two identical and easily removable battery packs and their electronic control unit. The ASPSU is automatically rechargeable through the aircraft DC power supply. The switching from aircraft power supply to ASPSU power supply and vice versa, is fully automatic. The ASPSU will supply DC power to the residual pressure warning system for approximately 60 minutes on a de-powered aircraft when the warning is triggered. An ASPSU test is possible through the Cabin Intercommunication Data System (CIDS).



DOORS AND ESCAPE SLIDES CONTROL SYSTEM (DSCS) - PROXIMITY SWITCH CONTROL UNIT (PSCU)

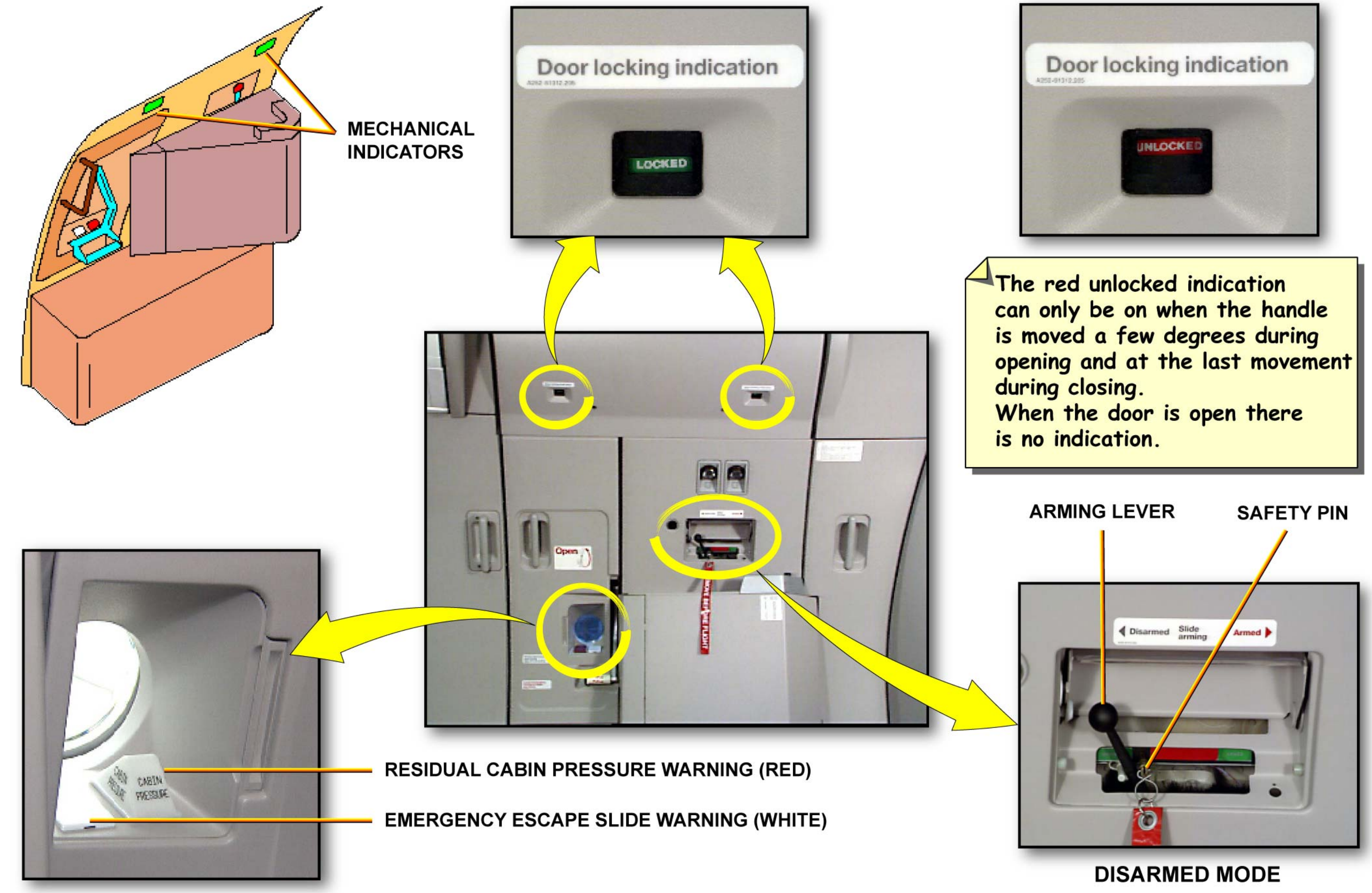
52 DOORS SYSTEM PRESENTATION (1)

CONTROL AND INDICATING

PASSENGER DOORS

The door has two mechanical indicators showing the LOCKED or UNLOCKED positions. The arming lever modes (armed or disarmed) are shown on the door lining above the lever recess. The lever is secured in the disarmed position by a safety pin. A viewing prism window lets the two door warning lights be seen from inside or outside.
Two interior warning lights are located below the window:
- a white light indicates the armed configuration of the evacuation system, if the door handle is moved towards open,
- a red flashing light tells the operator that the cabin is still pressurized.

NOTE: The red unlocked indication will only be on when the handle is moved a few degrees during opening and at the last movement during closing. When the door is open there is no indication.



CONTROL AND INDICATING - PASSENGER DOORS

G6B08031 - G10T4T0 - FM52P7000000001

52 DOORS SYSTEM PRESENTATION (1)

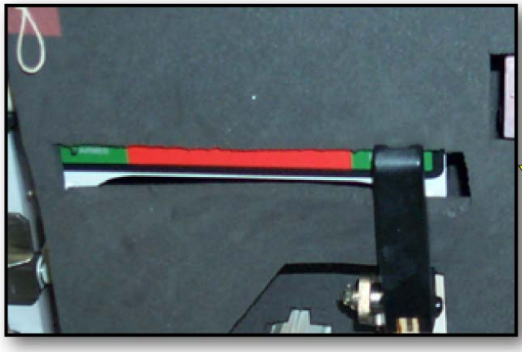
CONTROL AND INDICATING (continued)

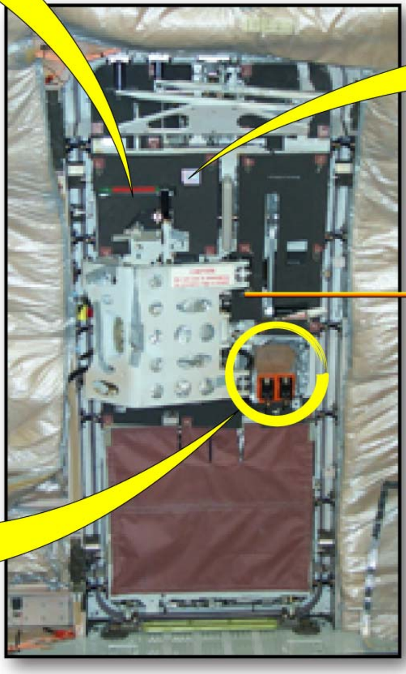
TYPE I EMERGENCY EXIT DOOR

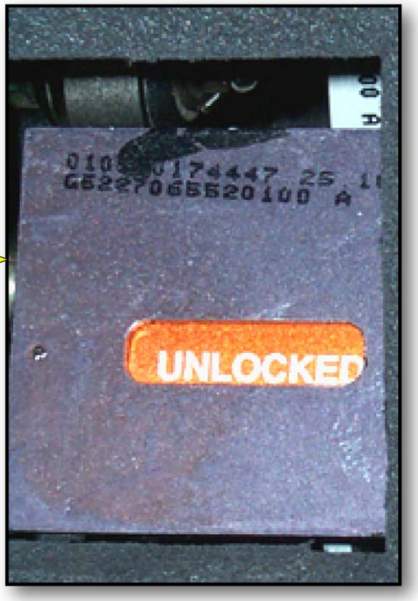
There is only one mechanical indicator showing the door condition (LOCKED or UNLOCKED).

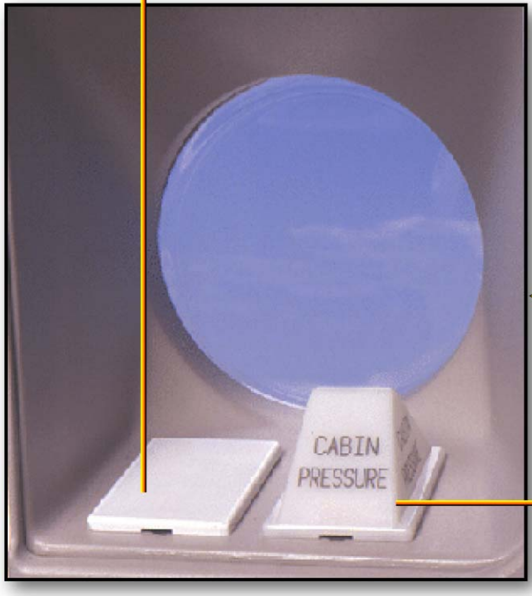
NOTE: The red UNLOCKED indication will only be on when the handle is moved a few degrees during opening and at the last movement during closing. When the door is open there is no indication.

All the other indications and warnings are similar to the passenger/crew door.









The red unlocked indication can only be on when the handle is moved a few degrees during opening and at the last movement during closing. When the door is open there is no indication.

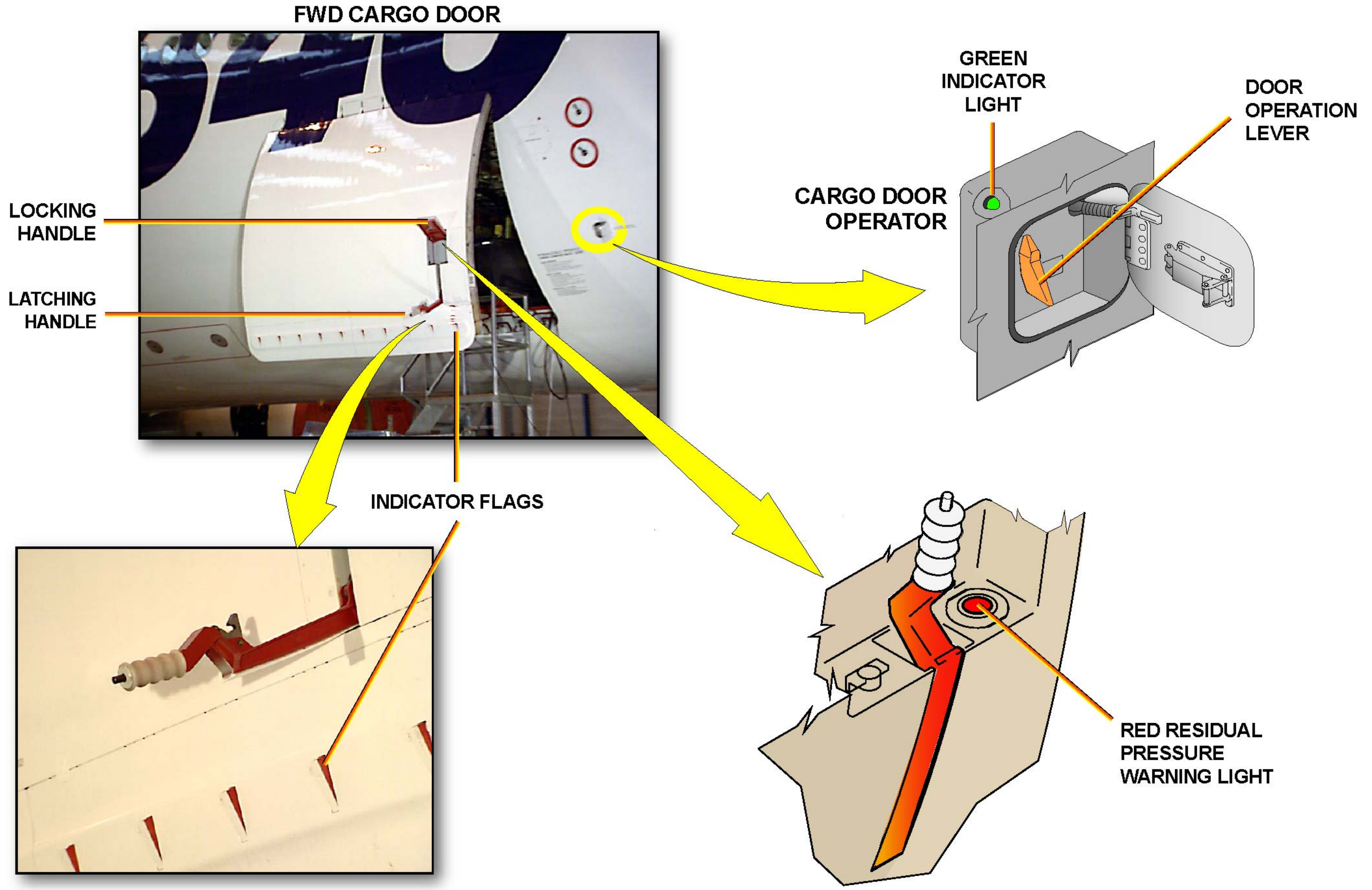
CONTROL AND INDICATING - TYPE I EMERGENCY EXIT DOOR

52 DOORS SYSTEM PRESENTATION (1)

CONTROL AND INDICATING (continued)

CARGO DOORS

Each door has ten indicator flags showing hooks unlocked. In the door manual selector valve recess, a green light comes on when the door is locked in the fully open position. If the green light is not available for cargo loading procedure a safety sleeve has to be installed on the actuator piston. A red light in the latching handle recess flashes when there is residual pressure in the cabin.



CONTROL AND INDICATING - CARGO DOORS

G6B08031 - G10T4T0 - FM52P7000000001

52 DOORS SYSTEM PRESENTATION (1)

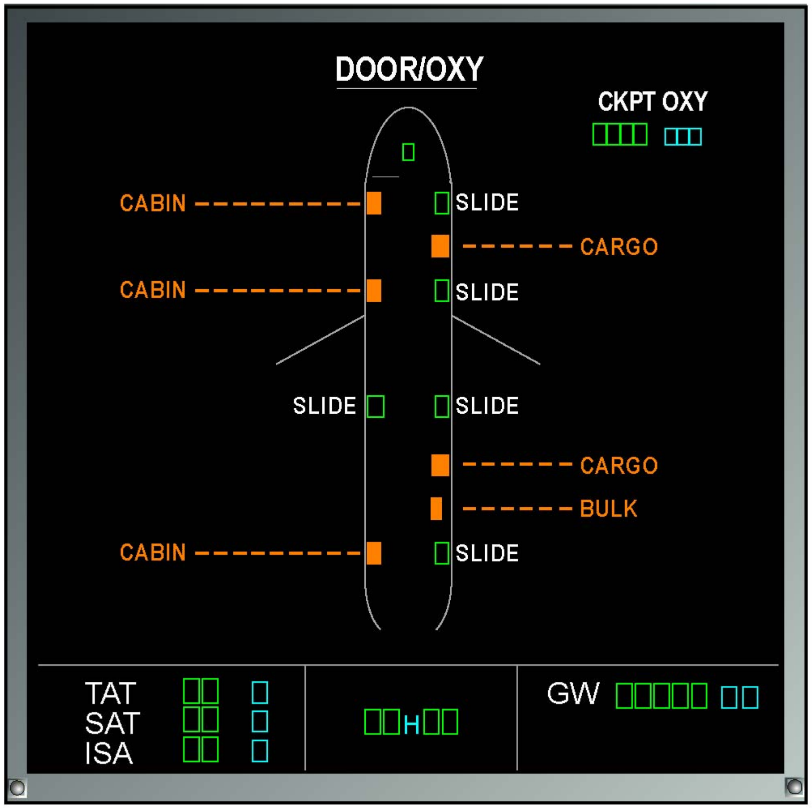
CONTROL AND INDICATING (continued)

ECAM DOOR/OXY PAGE

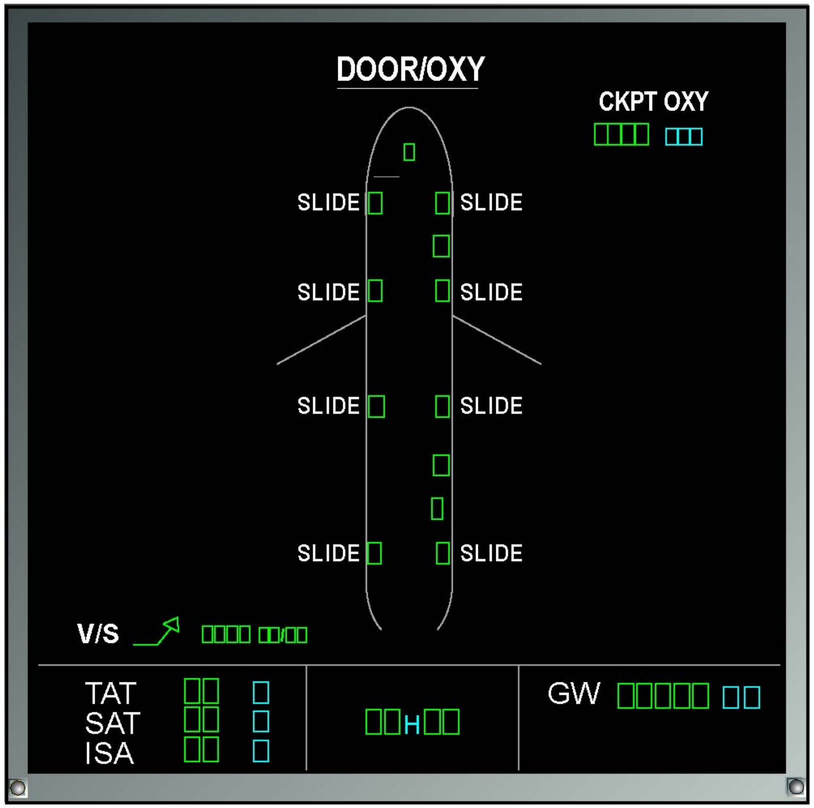
The ECAM DOOR/OXY page monitors the status of all the doors and the escape slide/slide raft.
The indications on the ECAM page are:
- green when the door is closed and locked,
- amber when the door is unlocked.

The white SLIDE indications on the DOOR/OXY page show that the slides are armed. When the slide is disarmed on any door no indication is displayed.

A330 ECAM DOOR/OXY pages taken as exemple. Indications are identical for A340 aircraft.



IN GROUND CONFIGURATION



IN FLIGHT CONFIGURATION

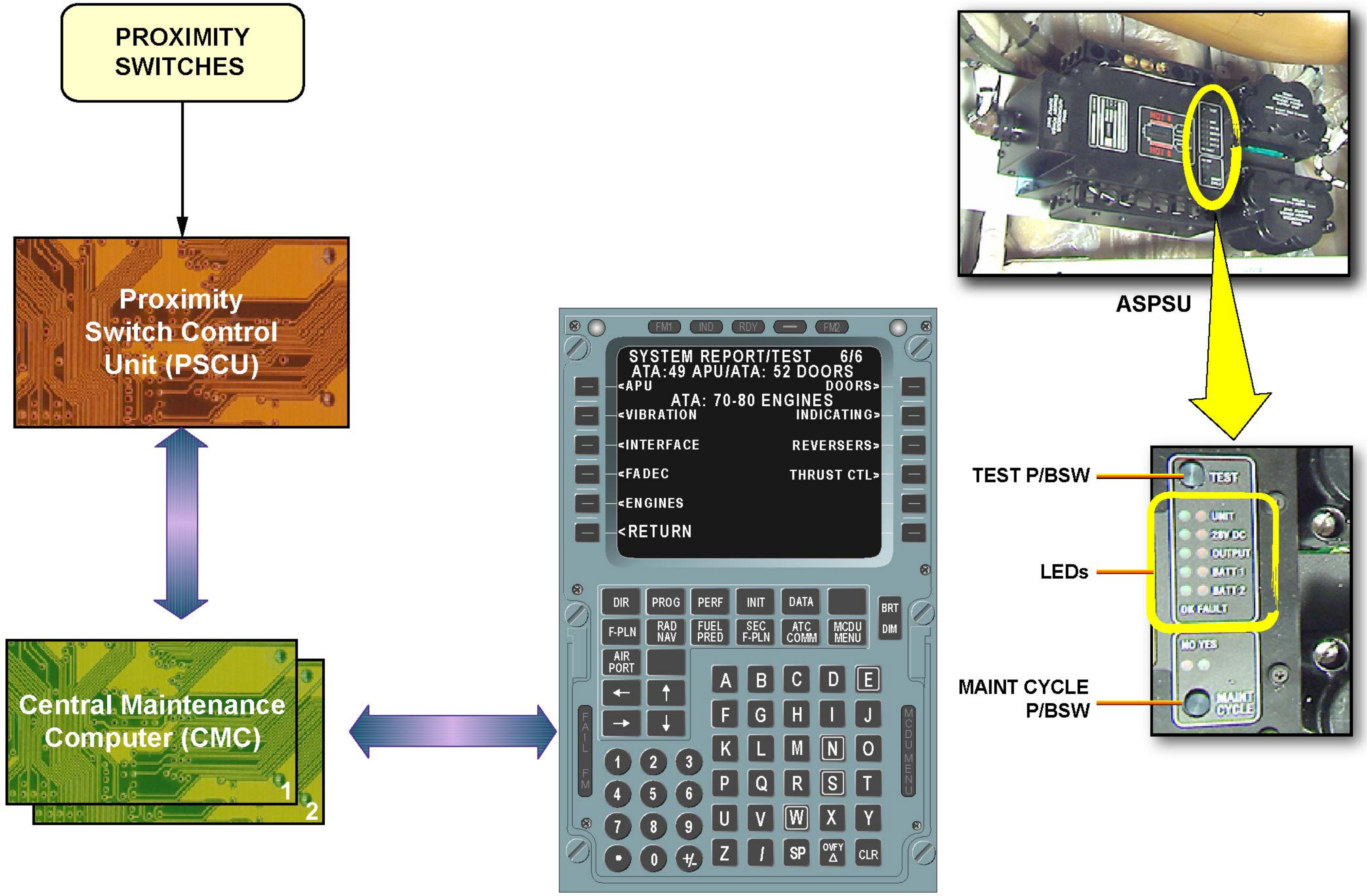
CONTROL AND INDICATING - ECAM DOOR/OXY PAGE

52 DOORS SYSTEM PRESENTATION (1)

MAINTENANCE/TEST FACILITIES

The DSCS can be tested via the MCDU SYSTEM REPORT/TEST pages.
The PSCU has a BITE. The BITE is used for the in-flight monitoring, on ground trouble shooting and continuous self-testing. All fault data are transmitted through ARINC 429 buses to the Central Maintenance Computers (CMCs).
Their functions are to:
- find and indicate faults,
- identify defective electrical components which are Line Replaceable Units (LRU) for maintenance and trouble-shooting,
- identify defective components that are Shop Replaceable Units (SRU).

The ASPSU also has a BITE used for system test and a battery capacity test. For these tests, the ASPSU has a test panel with two P/Bs and a Light Emitting Diode (LED) display.



MAINTENANCE/TEST FACILITIES

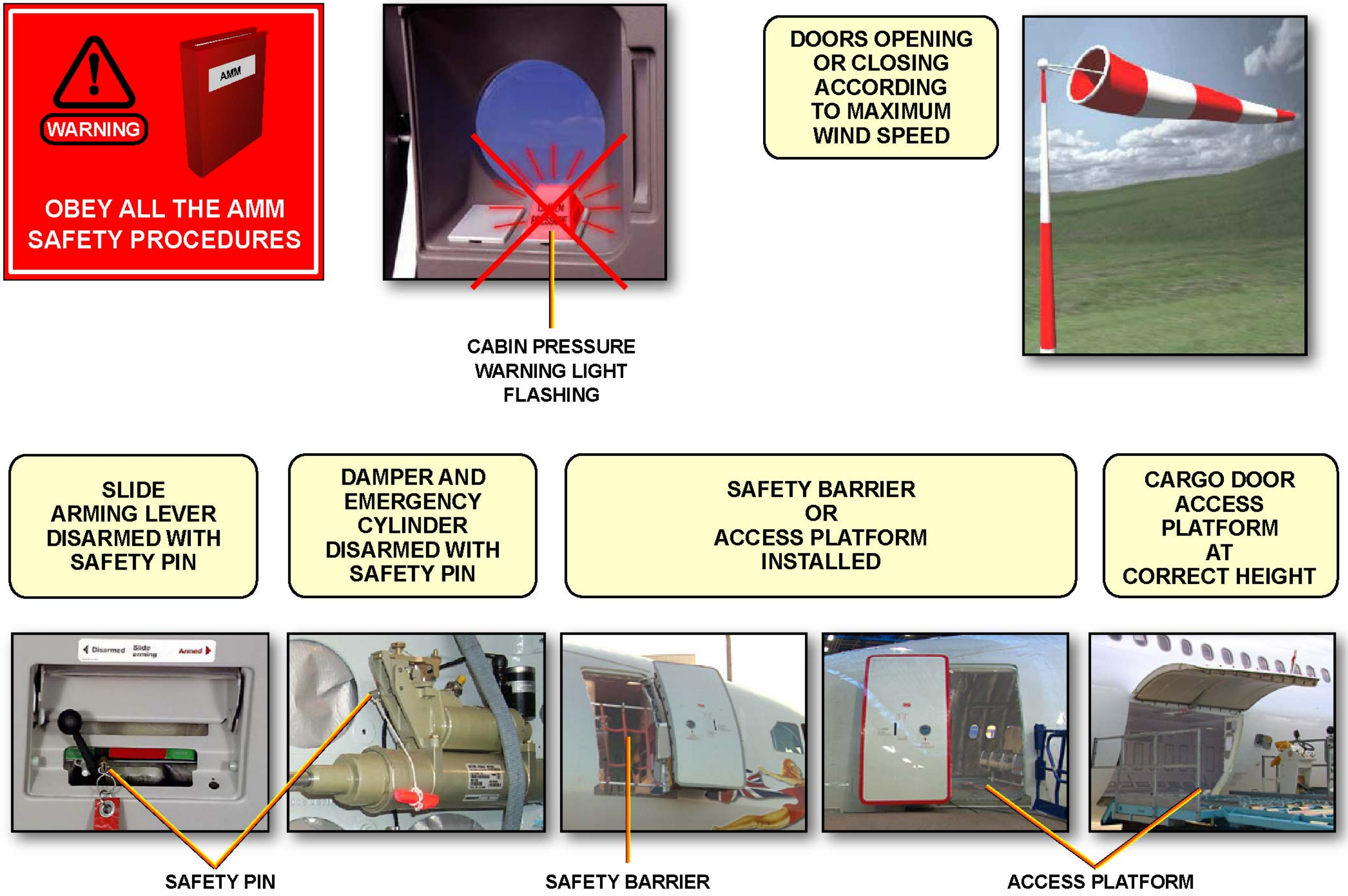
G6B08031 - G10T4T0 - FM52P7000000001

52 DOORS SYSTEM PRESENTATION (1)

SAFETY PRECAUTIONS

WARNING: WHEN YOU WORK ON THE A/C, MAKE SURE THAT YOU OBEY ALL THE AMM SAFETY PROCEDURES. THIS WILL PREVENT INJURY TO PERSONS AND/OR DAMAGE TO THE A/C.
HERE IS AN OVERVIEW OF THE MAIN SAFETY PRECAUTIONS ABOUT THE DOORS SYSTEM.
IF THE RED WARNING LIGHT IS FLASHING, DO NOT OPERATE THE DOOR OPENING HANDLE.

Be careful before opening cabin doors or cargo doors. Make sure that the red warning light does not flash. If it flashes, that means there is a residual pressure in the cabin or in cargo compartment, and any door may suddenly open. It could kill or cause serious injury and damage to the aircraft.
Make sure when you work on a cabin door that the emergency control handle is in the disarmed position with the safety pin installed.
Check that the percussion lever of the door damper and emergency operation cylinder is in the disarmed position with the safety pin installed.
Install a safety barrier or an access platform before opening any cabin door to avoid a fall on the ground.
When opening or closing a cargo door, make sure that the access platform is at the correct height to avoid damage.
Do not operate a cabin/cargo door if the wind speed is more than 40 kts, you must close a cabin/cargo door before the wind speed is more than 60 kts to prevent damage to the door or to the aircraft.



SAFETY PRECAUTIONS

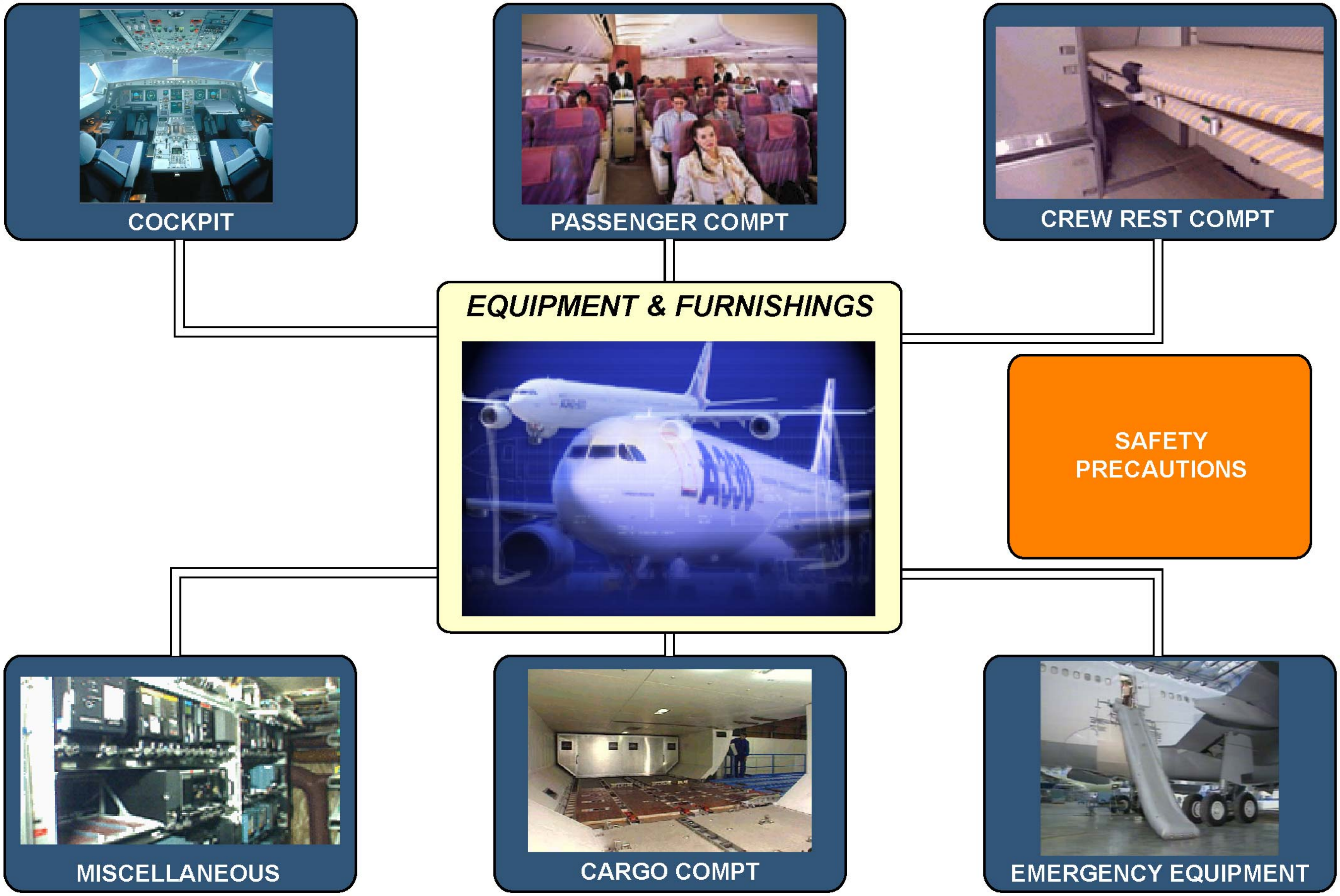
G6B08031 - G10T4T0 - FM52P7000000001

25 EQUIPMENT/FURNISHINGS SYSTEM PRESENTATION (1)

GENERAL

The equipment and furnishings chapter covers:
- the cockpit,
- the passenger compartment,
- the crew rest compartment,
- the emergency equipment,
- the cargo compartments,
- the miscellaneous compartments.

When you work on aircraft, you must obey all the safety procedures listed in the Aircraft Maintenance Manual (AMM).


COCKPIT
PASSENGER COMPT
CREW REST COMPT
EQUIPMENT & FURNISHINGS
SAFETY
PRECAUTIONS
MISCELLANEOUS
CARGO COMPT
EMERGENCY EQUIPMENT

GENERAL

25 EQUIPMENT/FURNISHINGS SYSTEM PRESENTATION (1)

COCKPIT

Lining and furnishing panels, which provide flight compartment decoration, complete the heat and sound insulation. They are easily removable to give access to the installations they conceal. The cockpit panels include:
- the overhead panel,
- the glareshield,
- the main instrument panel,
- and the center pedestal.

The linings also give various stowage possibilities.

OVERHEAD PANEL
GLARESHIELD
MAIN INSTRUMENT PANEL
CENTER PEDESTAL

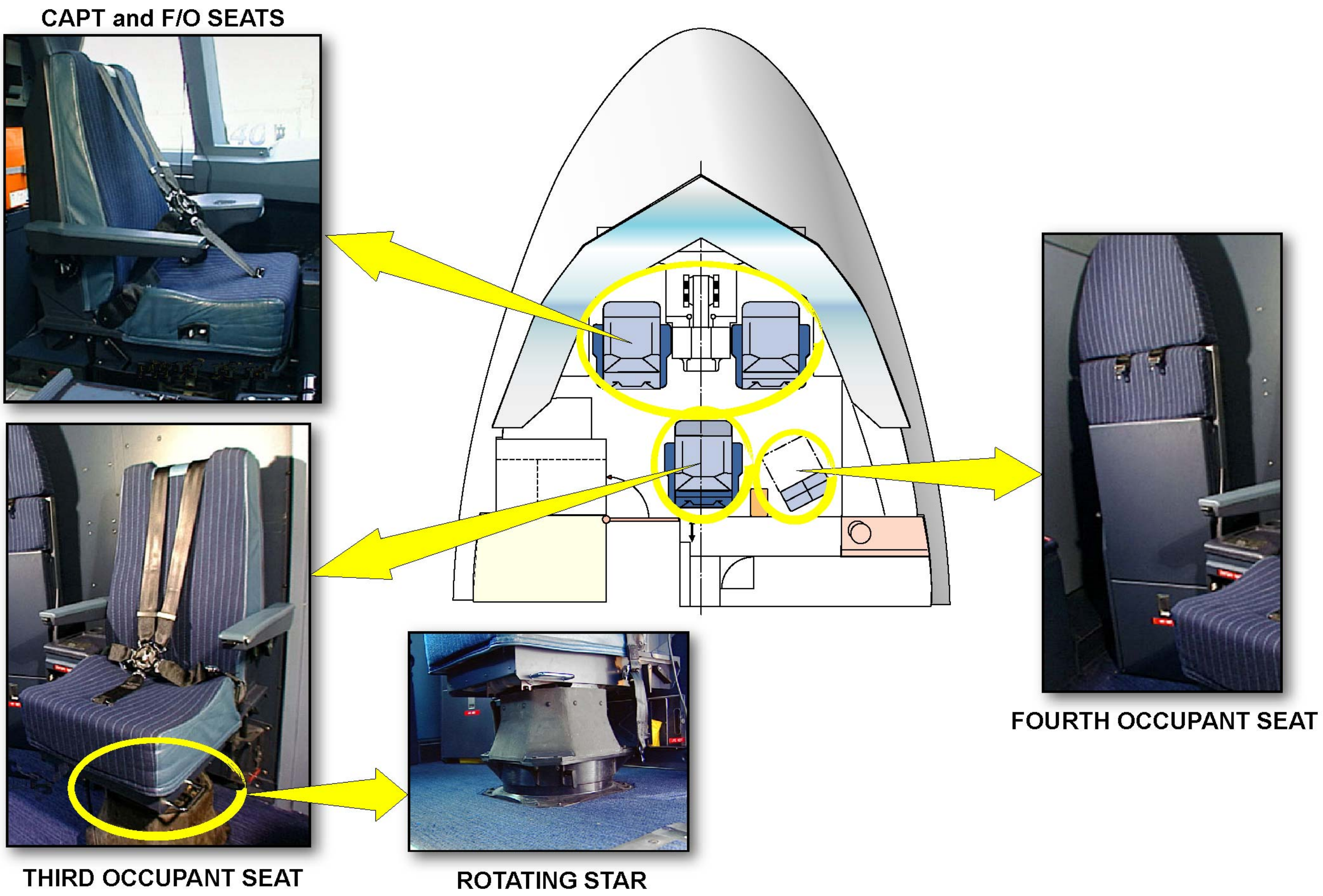
COCKPIT

25 EQUIPMENT/FURNISHINGS SYSTEM PRESENTATION (1)

COCKPIT (continued)

COCKPIT SEATS

The cockpit has four seats. A CAPT seat, a F/O seat, a third occupant seat and a fourth occupant (folding type) seat. The CAPT and F/O seats are symmetrical and have both electrical and mechanical controls for position adjustment. The third occupant seat is identical in structure and in shape to the F/O seat, but it is raised on a rotating "star" which rotates, and the controls are mechanical. The fourth occupant seat is a folding type seat and cannot be adjusted.



COCKPIT - COCKPIT SEATS

25 EQUIPMENT/FURNISHINGS SYSTEM PRESENTATION (1)

COCKPIT (continued)

FLIGHT CREW FOOT WARMERS

The flight crew foot warmers have heating panels controlled by a switch located on the CAPT and F/O LighTing panels.

COCKPIT - FLIGHT CREW FOOT WARMERS

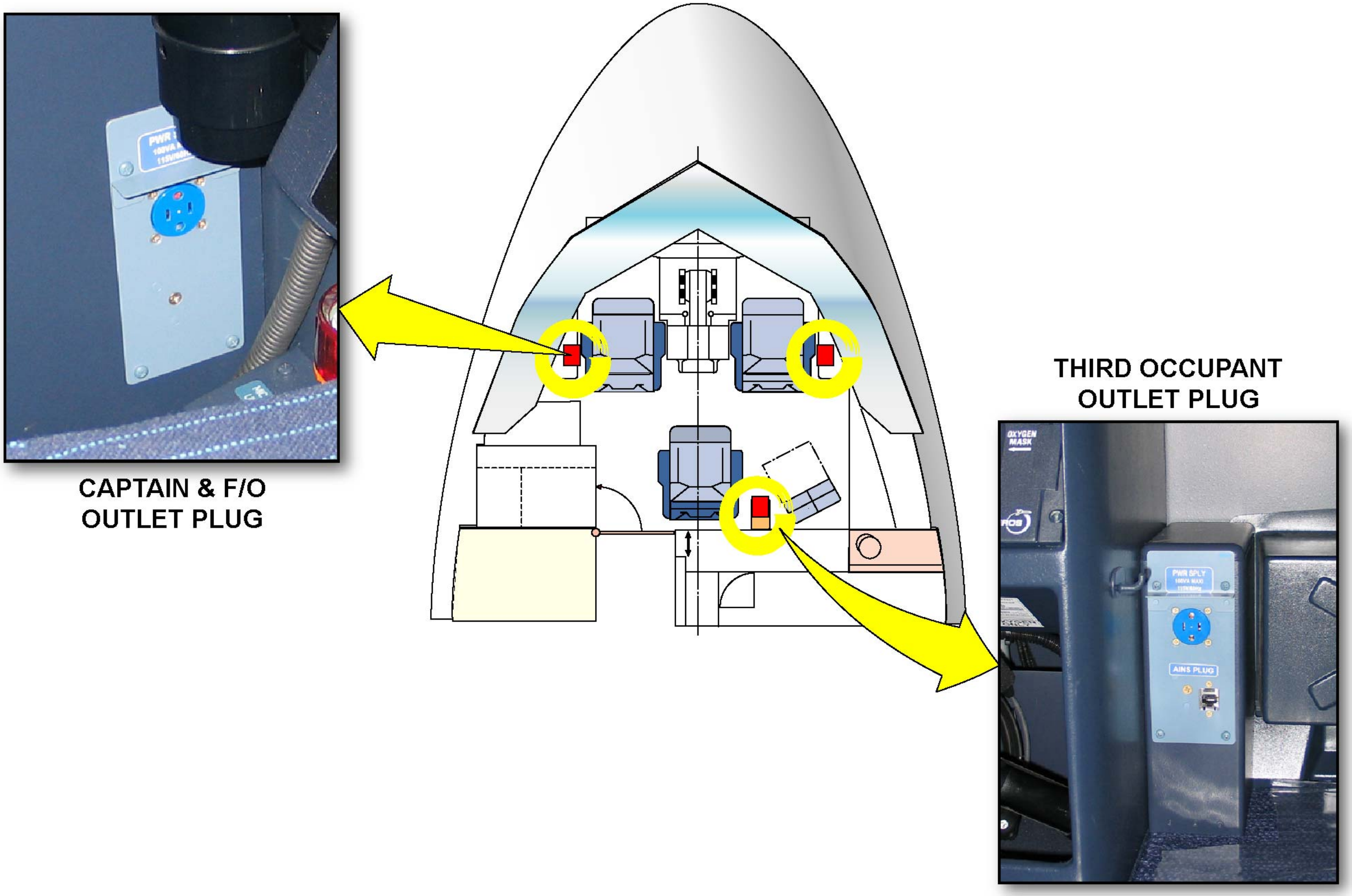
25 EQUIPMENT/FURNISHINGS SYSTEM PRESENTATION (1)

COCKPIT (continued)

COCKPIT ELECTRICAL OUTLETS

CAPT, F/O and third occupant electrical outlets are capable of meeting both European standards:
- one standard for connecting 6-10 A (4mm diameter plugs),
- one standard for connecting 15 A (4.8mm diameter plugs).

Depending on the aircraft electrical configuration, these 115V 60 Hz outlets can provide up to 100 VA or 150 VA.

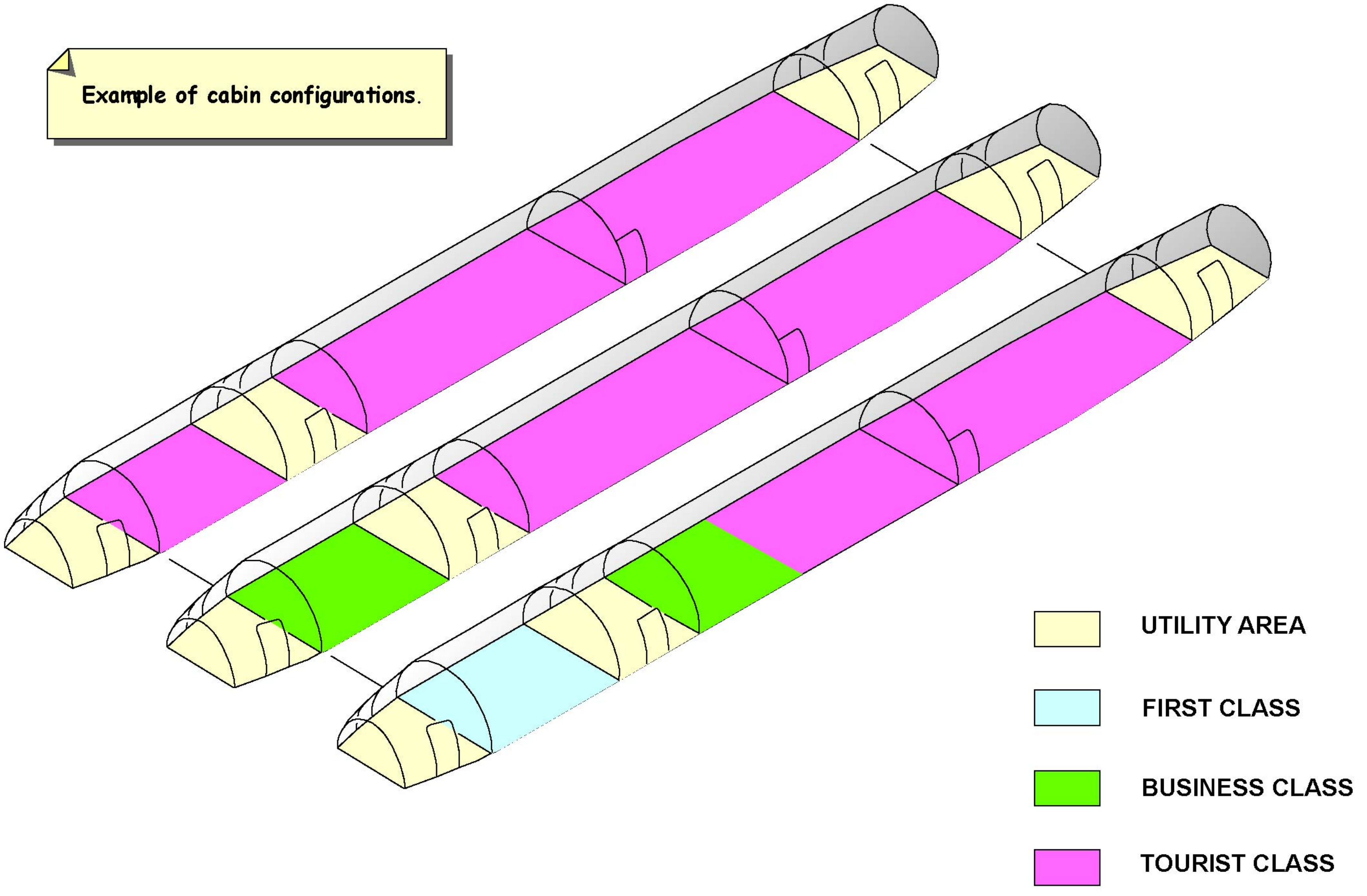


COCKPIT - COCKPIT ELECTRICAL OUTLETS

25 EQUIPMENT/FURNISHINGS SYSTEM PRESENTATION (1)

PASSENGER COMPARTMENT

The cabin can have three different configurations:
- one first class, one business class and one tourist class,
- one business class and one tourist class,
- one tourist class only.



PASSENGER COMPARTMENT

25 EQUIPMENT/FURNISHINGS SYSTEM PRESENTATION (1)

PASSENGER COMPARTMENT (continued)

PASSENGER SEATS

There are three different classes of passenger seats:
- first class,
- business class,
- tourist class.

BUSINESS CLASS

FIRST CLASS

TOURIST CLASS

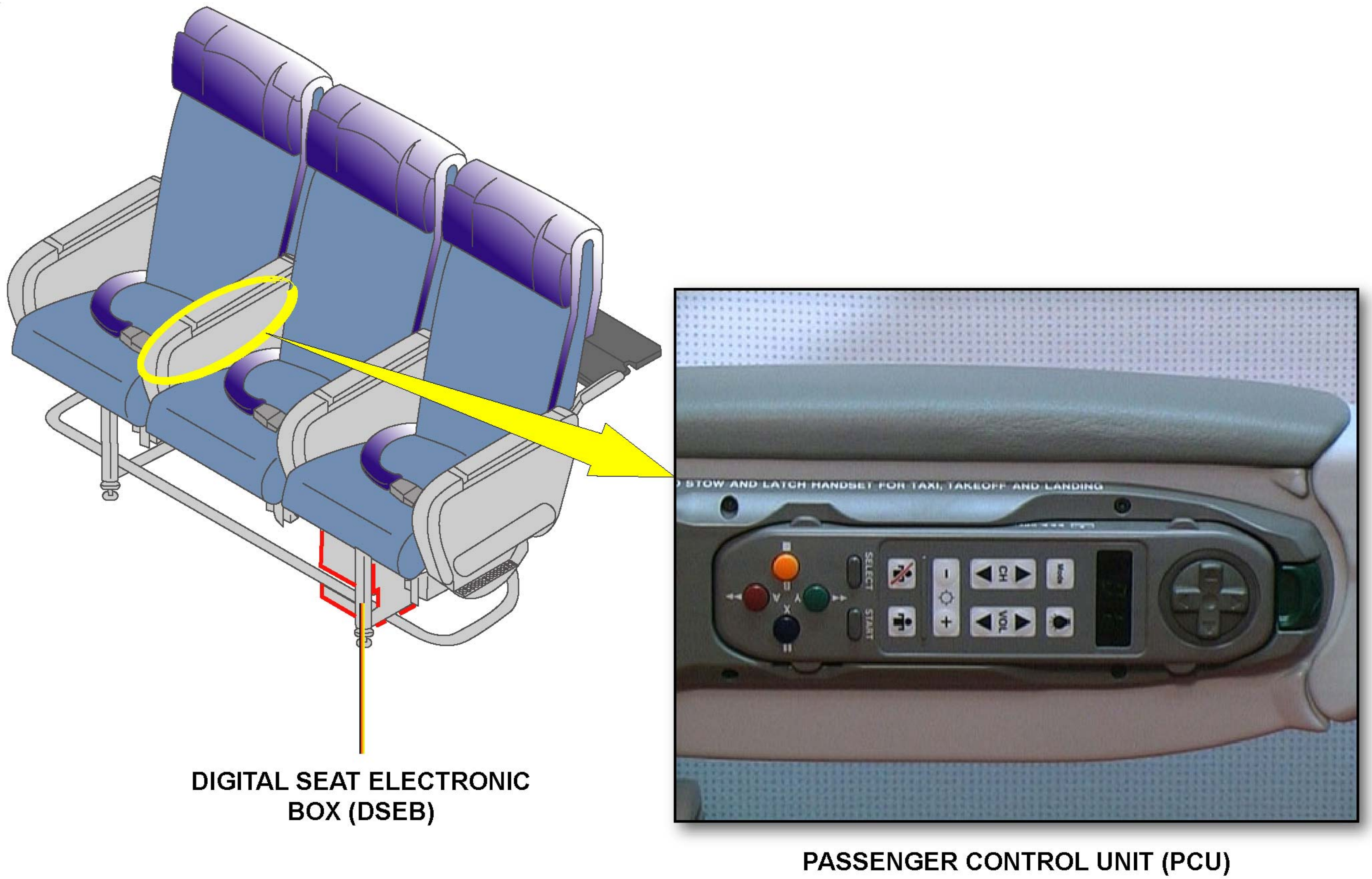
PASSENGER COMPARTMENT - PASSENGER SEATS

25 EQUIPMENT/FURNISHINGS SYSTEM PRESENTATION (1)

PASSENGER COMPARTMENT (continued)

PASSENGER CONTROL UNITS

The Passenger Control Unit (PCU) is installed in the armrest. The PCU fulfills the interface between the passenger, the headset, the video screen and the Digital Seat Electronic Box (DSEB). Under each passenger seat, there is a DSEB. The DSEB fulfills the interface between the PCU and the In-Flight Entertainment (IFE) system.



PASSENGER COMPARTMENT - PASSENGER CONTROL UNITS

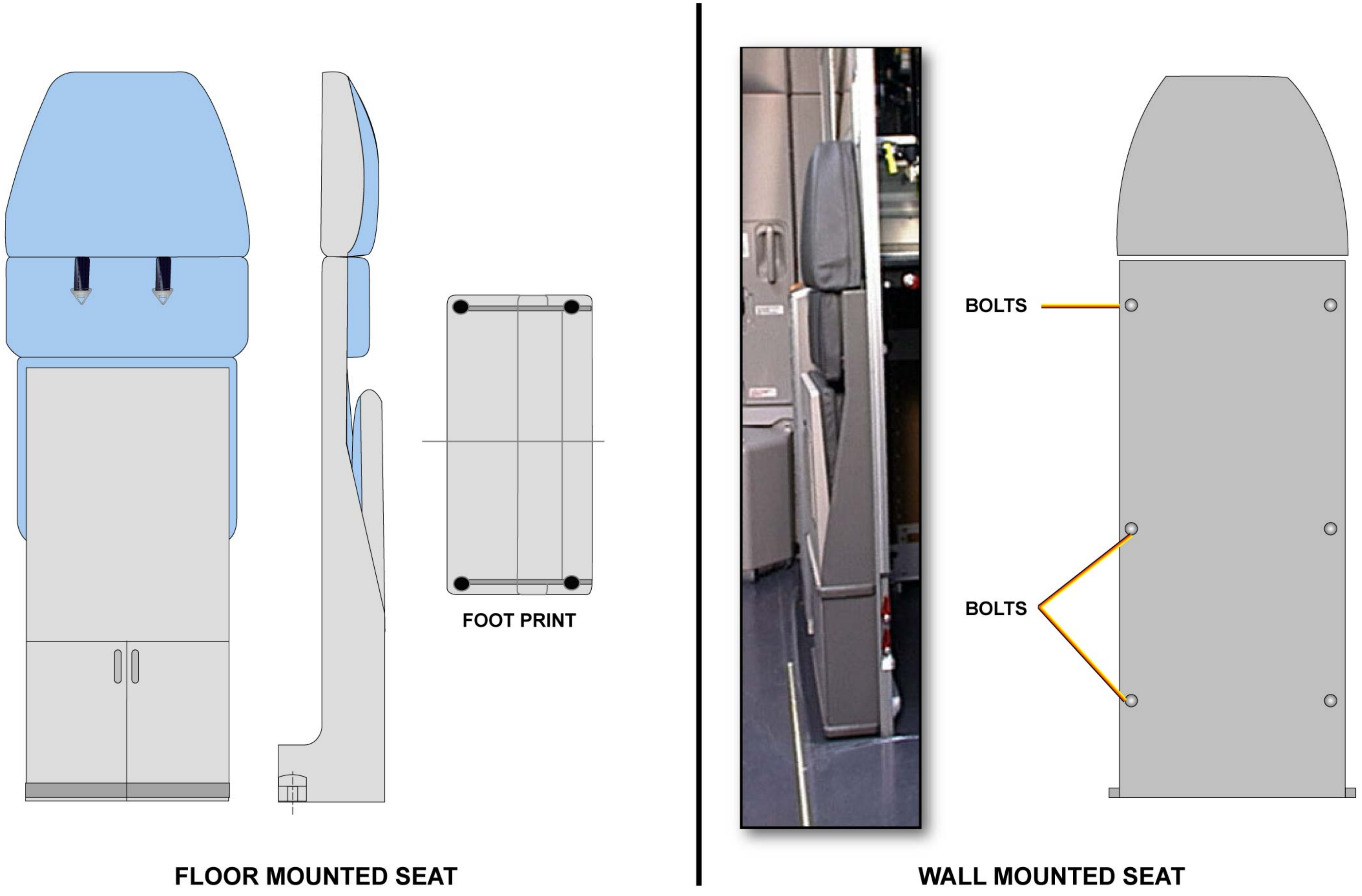
25 EQUIPMENT/FURNISHINGS SYSTEM PRESENTATION (1)

PASSENGER COMPARTMENT (continued)

CABIN ATTENDANT SEATS

There are two types of cabin attendant seat, floor-mounted or wall-mounted, all are folding seats. The floor-mounted cabin attendant seats are attached to the cabin floor structure (hard point mounted) or to the seat track. The wall-mounted cabin attendant seats are installed on:
- the lavatory walls,
- the galley walls,
- the stowage walls.

Depending on the cabin configuration, the number and location of cabin attendant seats can vary.



PASSENGER COMPARTMENT - CABIN ATTENDANT SEATS

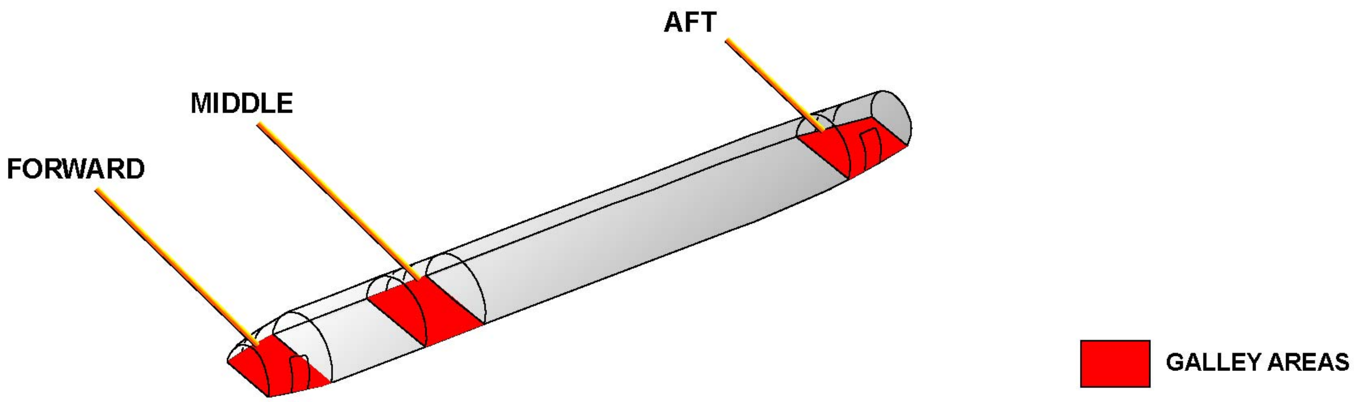
G6B08031 - G10T4T0 - FM25P9000000001

25 EQUIPMENT/FURNISHINGS SYSTEM PRESENTATION (1)

PASSENGER COMPARTMENT (continued)

GALLEYS

The galley equipment is installed to store and prepare food and drinks for the passengers and crew, and to store waste materials. The galley can be wet or dry. The wet unit galley is used to store and prepare food and drinks. It is provided with electrically operated equipment and provisions for potable and wastewater. The dry unit galley is used to store food, drinks and equipment. The number and the location of the galleys depend on the aircraft configuration. The forward galleys are installed in the forward cabin area, the middle galleys in the middle cabin area and the aft galleys in the aft cabin area. The galley cooling has an air chiller, which supplies cooled air to the galleys. The cooled air keeps food and drinks cold, which are stored in the trolleys.



WET GALLEYS

DRY GALLEYS

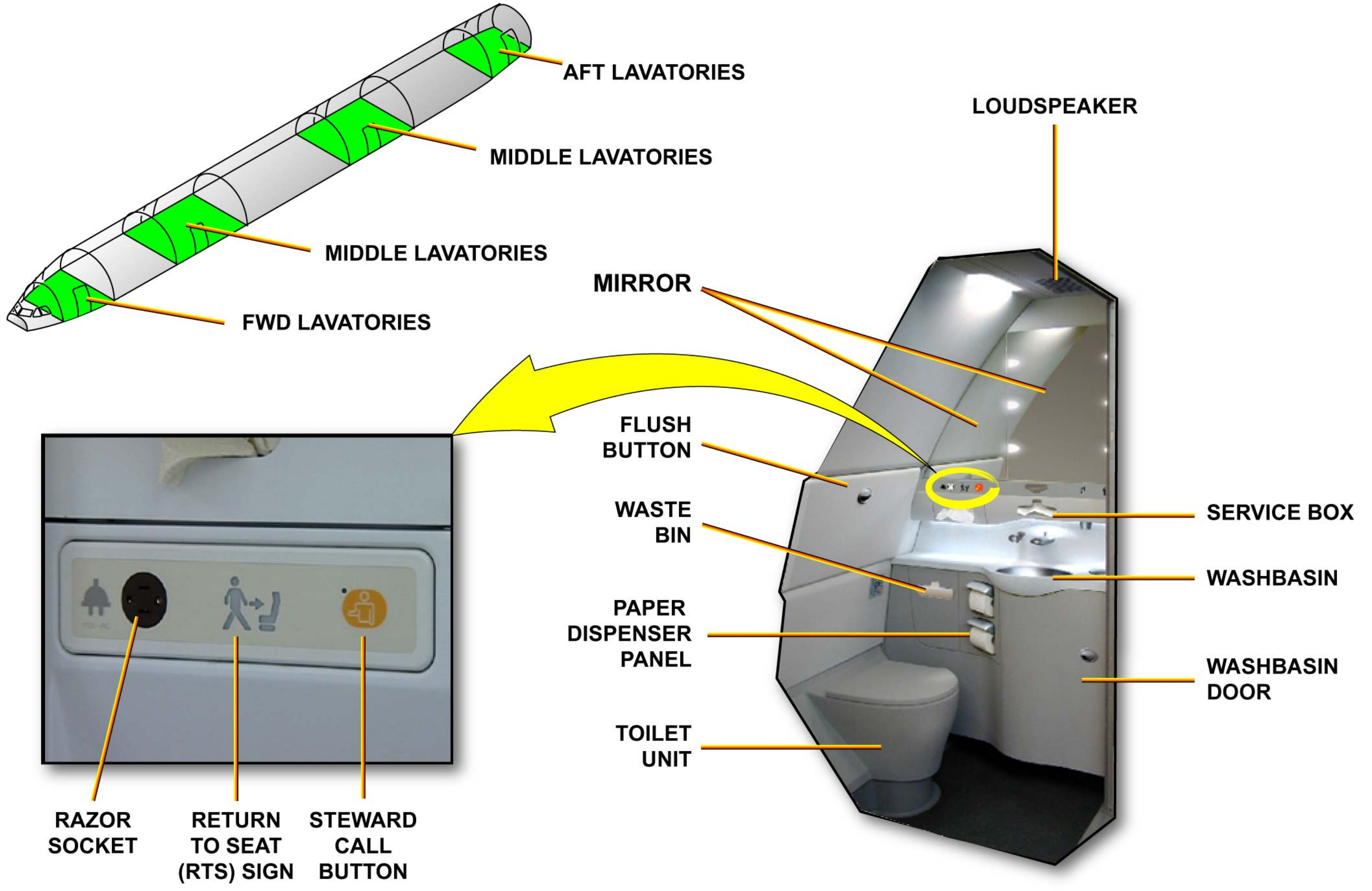
PASSENGER COMPARTMENT - GALLEYS

25 EQUIPMENT/FURNISHINGS SYSTEM PRESENTATION (1)

PASSENGER COMPARTMENT (continued)

LAVATORIES

The lavatories are installed in the cabin for the comfort of the passengers and the crew. Each lavatory also has a washroom function. Lavatories can be fixed to the ground by a seat rail or with a hard point. The number and the location of the lavatories depend on the aircraft configuration. The forward lavatories are installed in the forward passenger/crew door area. The middle lavatories are lateral lavatories, which are installed between the forward and aft passenger/crew doors areas. The center lavatories are installed where the mid and aft passenger/crew door areas and the aisles cross. The aft lavatories are lateral lavatories, which are installed in the aft passenger/crew door area. A razor socket is installed in each lavatory and in the crew rest room to supply power for an electrical razor.



PASSENGER COMPARTMENT - LAVATORIES

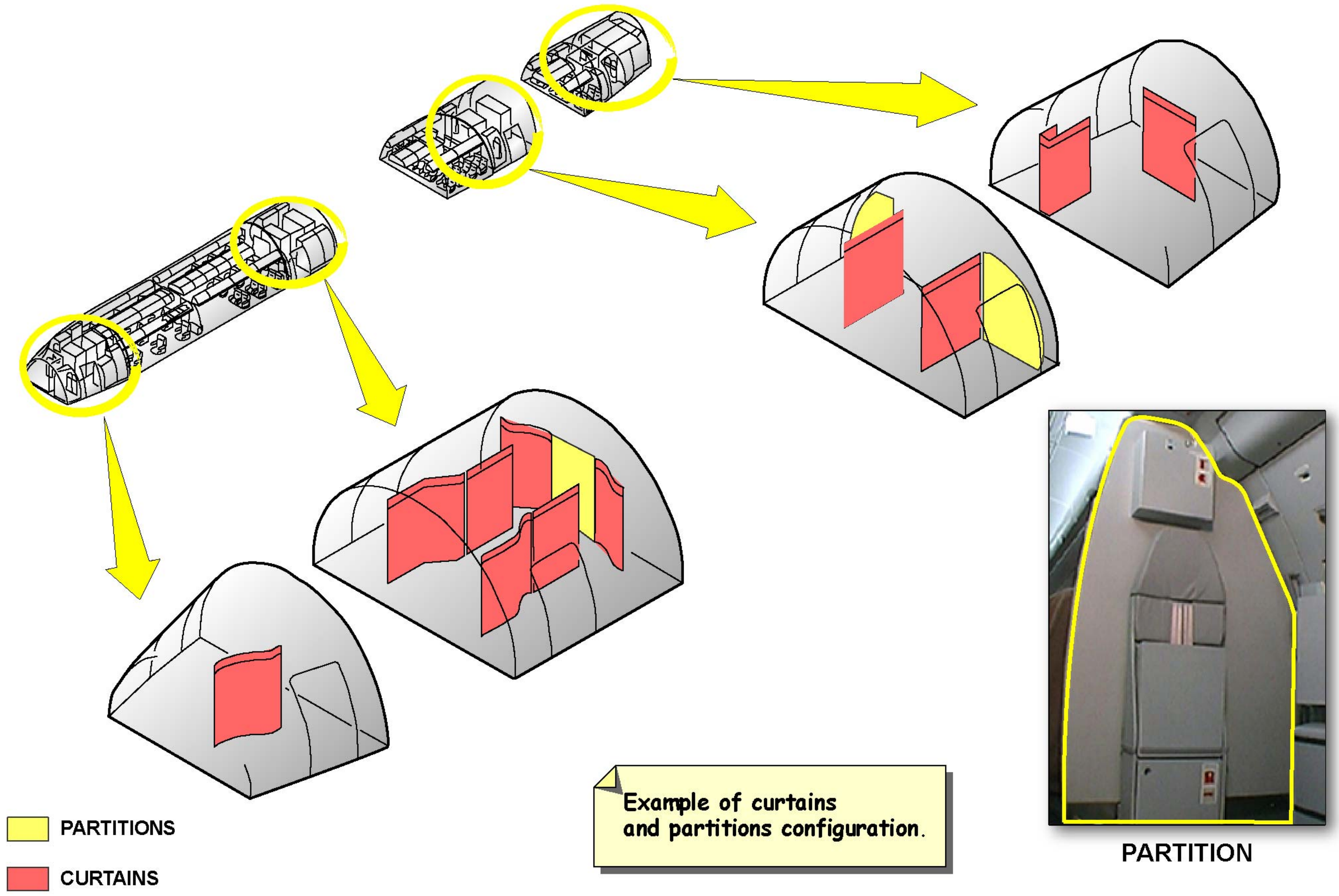
G6B08031 - G10T4T0 - FM25P9000000001

25 EQUIPMENT/FURNISHINGS SYSTEM PRESENTATION (1)

PASSENGER COMPARTMENT (continued)

CURTAINS AND PARTITIONS

The curtains and partitions are installed to divide the utility areas and seating areas in the cabin.



PASSENGER COMPARTMENT - CURTAINS AND PARTITIONS

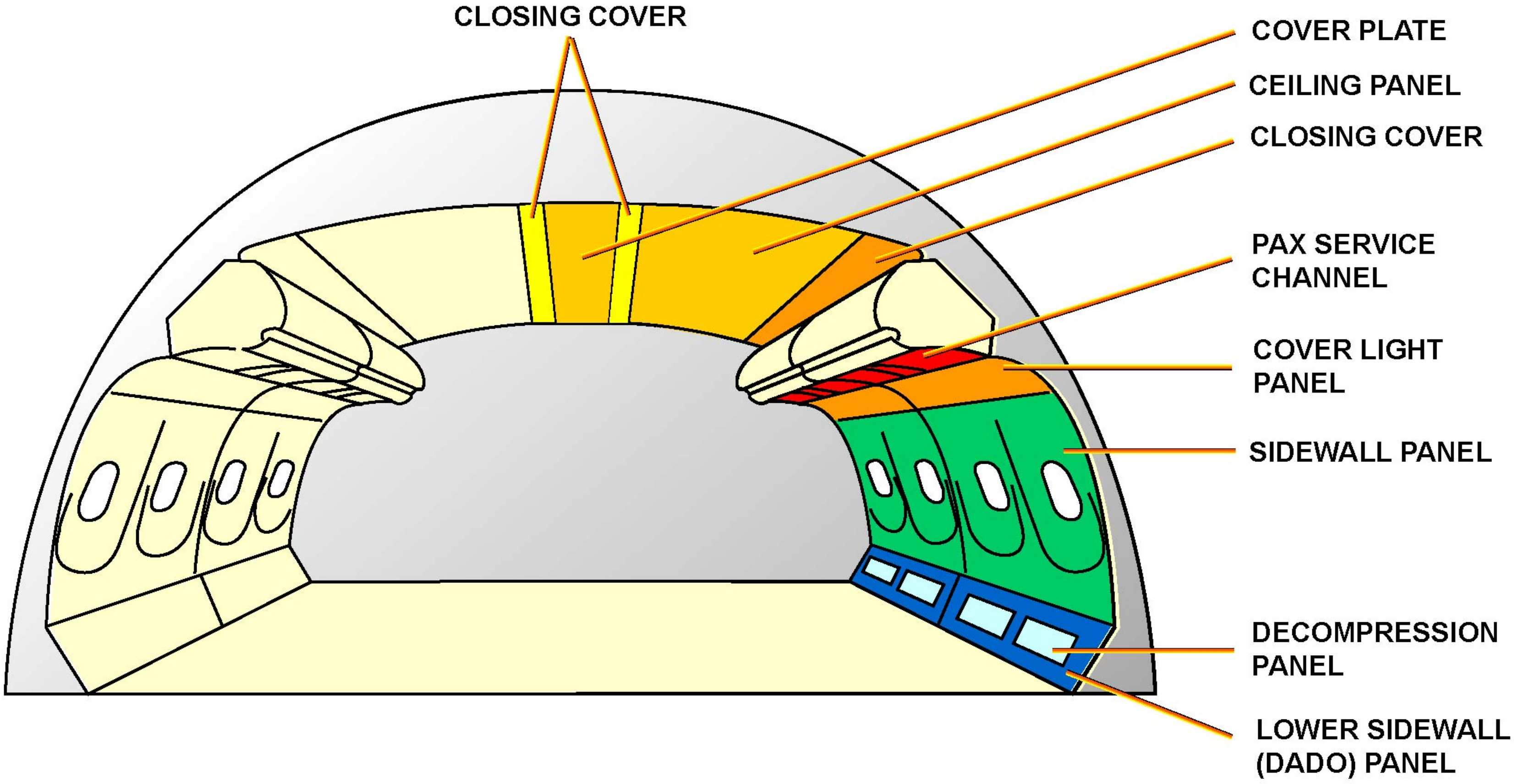
25 EQUIPMENT/FURNISHINGS SYSTEM PRESENTATION (1)

PASSENGER COMPARTMENT (continued)

CABIN PANEL LAYOUT

The cabin interior has removable panels. The lining design allows cabin customization. The lower sidewall (Dado) panels are mounted between the cabin floor and the sidewall panels. They have rapid decompression panels, which operate during decompression either in the cabin or in the cargo compartment. The sidewall panels are mounted on the side of the cabin. They include the window contour. Inner window panels and sun visors are installed on to the window frame. The closing cover panels cover the space between the ceiling panels and the cover light panels. The cover light panels cover the space between the sidewall panels and the overhead stowage compartments. The overhead bins or cover plates are removable. Removable ceiling panels are mounted in the cabin. They are installed over the full length of the cabin and the utility areas. The cover plates are installed where there is no overhead stowage compartment installed along the top.

G6B08031 - G10T4T0 - FM25P9000000001



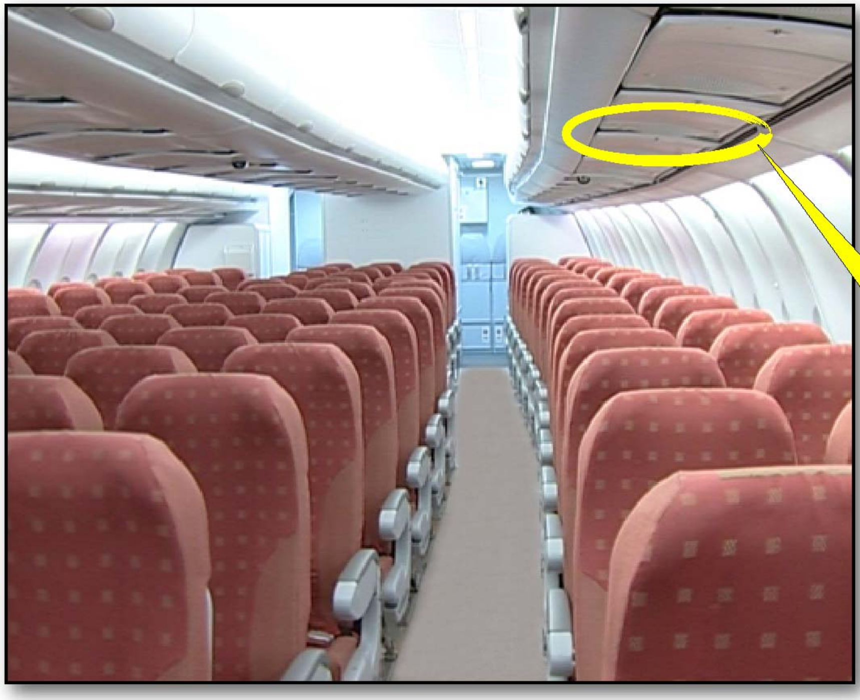
PASSENGER COMPARTMENT - CABIN PANEL LAYOUT

25 EQUIPMENT/FURNISHINGS SYSTEM PRESENTATION (1)

PASSENGER COMPARTMENT (continued)

PSU CHANNEL

The Passenger channel holds the Passenger Service Units (PSUs) to give service and information to the passengers.
The PSUs are installed in the passenger service channels adjacent to the emergency oxygen containers. The passenger service channels are found at the bottom of the overhead stowage compartments above each seat row. If the center overhead stowage compartments are not installed, the PSUs are installed in the cabin ceiling. The PSUs have LED reading lights. You can switch the lights ON or OFF with the related switch on the PCU in the seat armrest or on the PSU.



PASSENGER SERVICE INFORMATION UNIT (PSIU)

PASSENGER COMPARTMENT - PSU CHANNEL

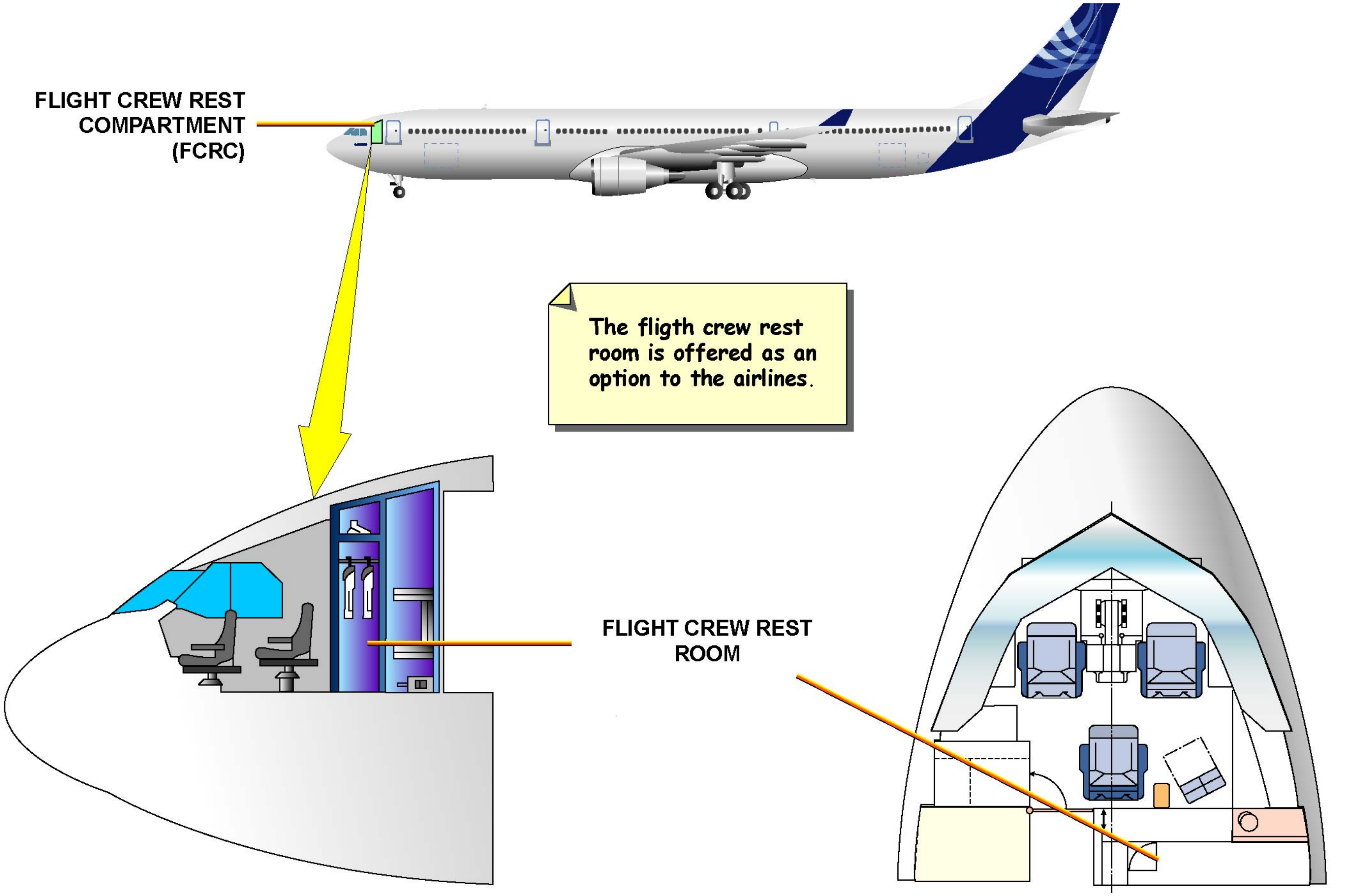
25 EQUIPMENT/FURNISHINGS SYSTEM PRESENTATION (1)

FLIGHT CREW REST ROOM

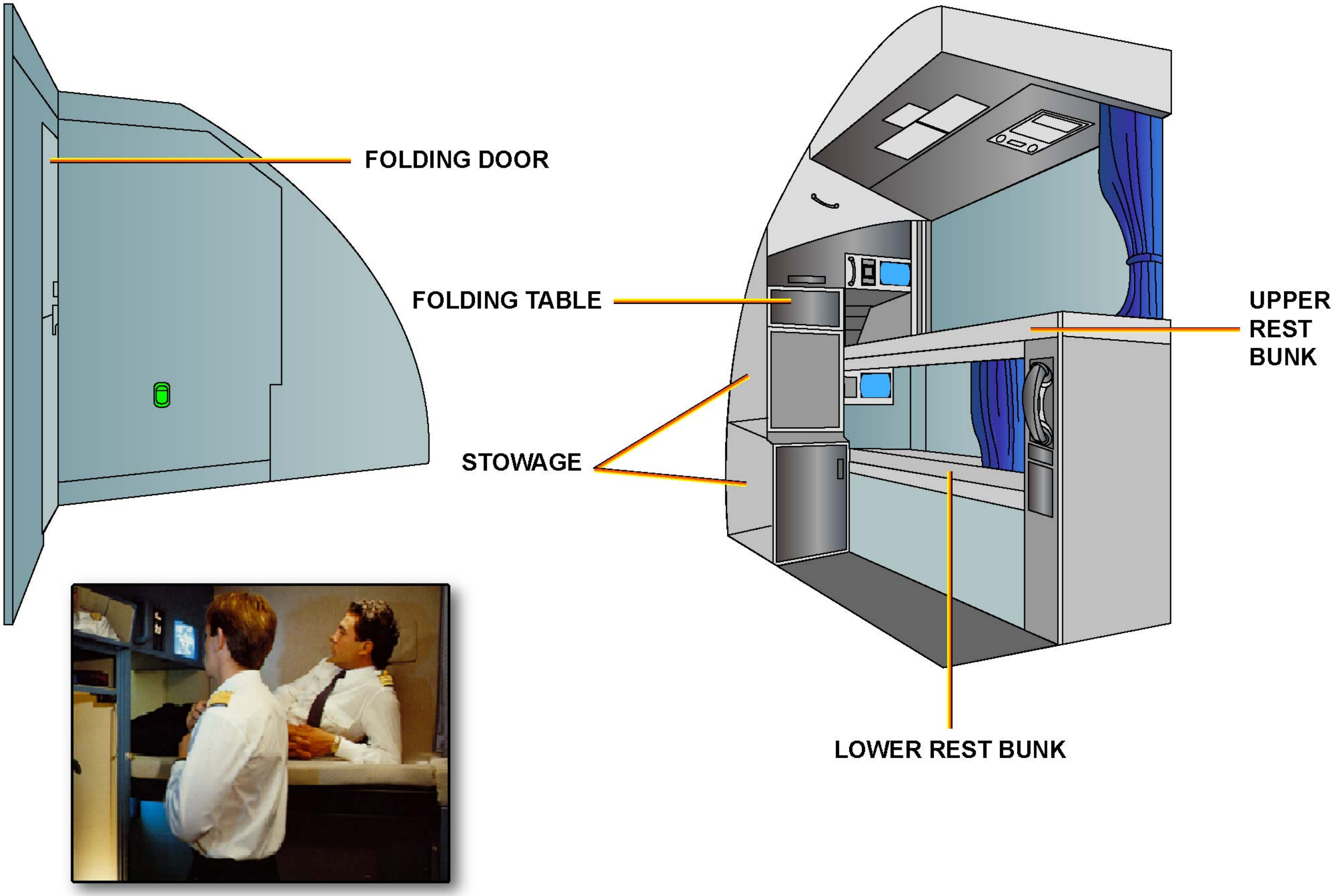
The crew rest room is installed behind the cockpit, on the right hand side. There, the flight crew members can relax on long trips.

NOTE: The flight crew rest room is offered as an option to the airlines.
The Flight Crew Rest Compartment (FCRC) has bunks and coat stowage. There are lower and upper rest bunks. The upper can be folded down to use the lower bunks as seats. A folding table is installed. A folding door or a single blade door (option) with a lock closes the compartment. This door can be opened into the cabin.

G6B08031 - G10T4T0 - FM25P9000000001



FLIGHT CREW REST ROOM



FLIGHT CREW REST ROOM

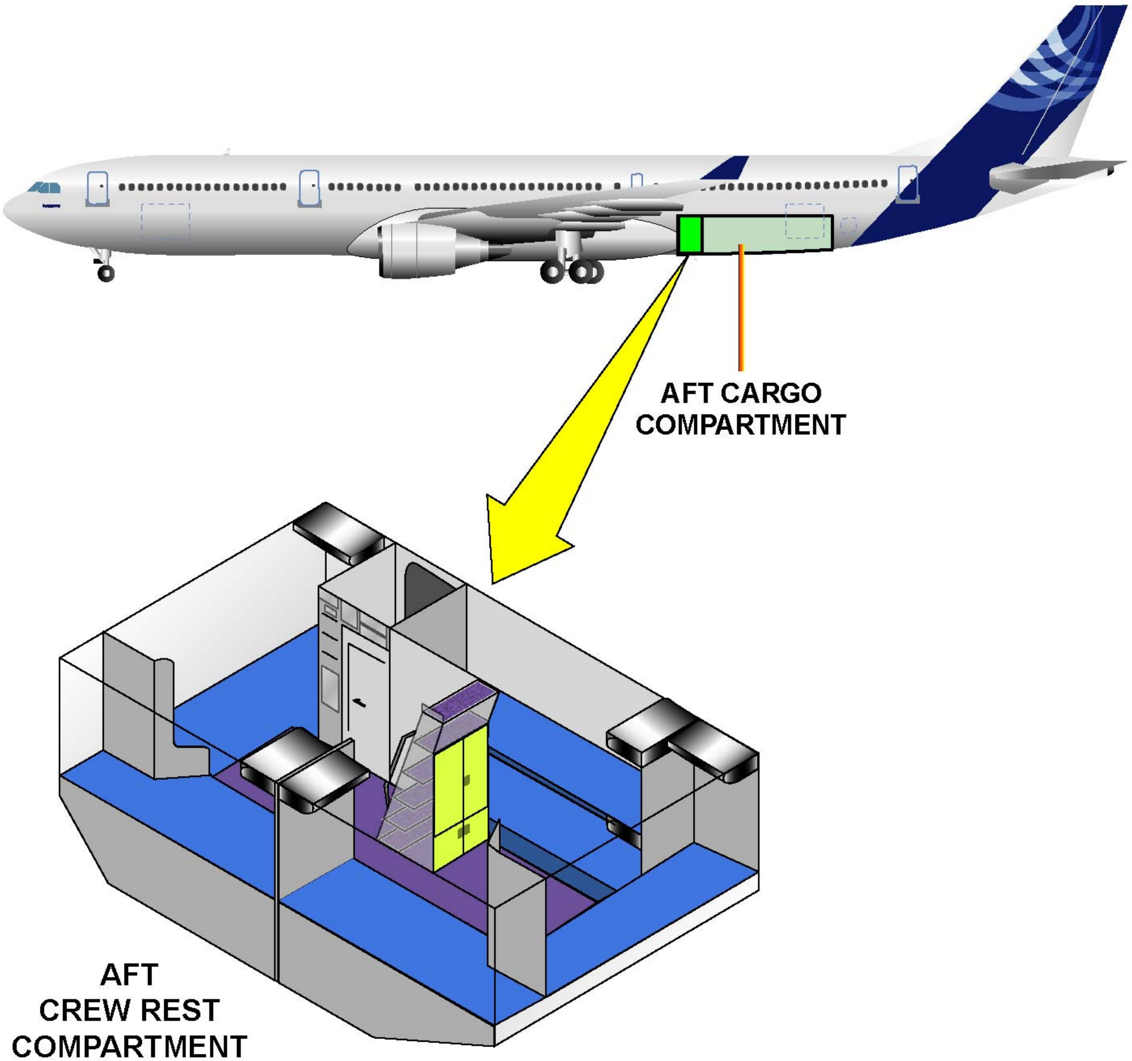
G6B08031 - G10T4T0 - FM25P9000000001

This Page Intentionally Left Blank

25 EQUIPMENT/FURNISHINGS SYSTEM PRESENTATION (1)

LDMCR COMPARTMENT

The Lower Deck Mobile Crew Rest (LDMCR) compartment is installed in the forward end of the aft cargo compartment. Its size is the same as a standard container. It is a fully assembled unit that can be removed or installed when required.
A staircase housing is located in the cabin above the LDMCR compartment with an access door in the cabin. An emergency exit hatch, which opens into the right cabin aisle is located at the top of the rest compartment on the right hand side. Lower and upper rest bunks are installed. Lower bunks without an upper bunk can be used as seats.
Stowage compartments are located in the staircase to store emergency equipment.



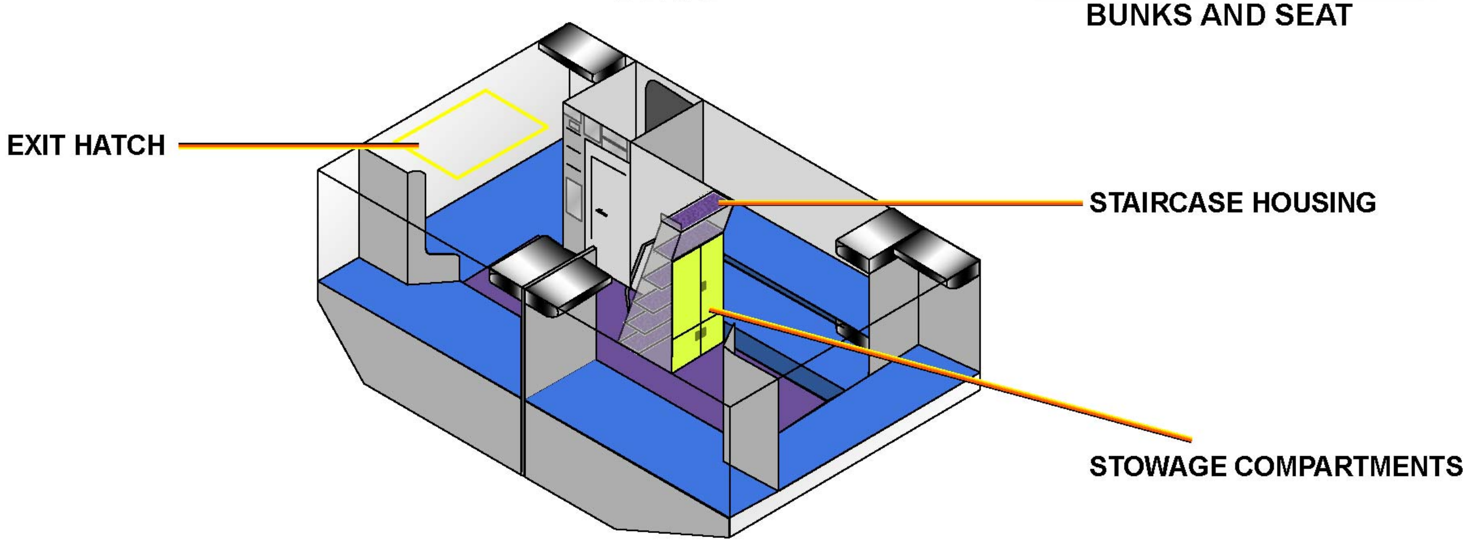
LDMCR COMPARTMENT

G6B08031 - G10T4T0 - FM25P9000000001

STAIRCASE

BUNKS

BUNKS AND SEAT



EXAMPLE OF LOWER DECK CREW REST COMPARTMENT CONFIGURATION

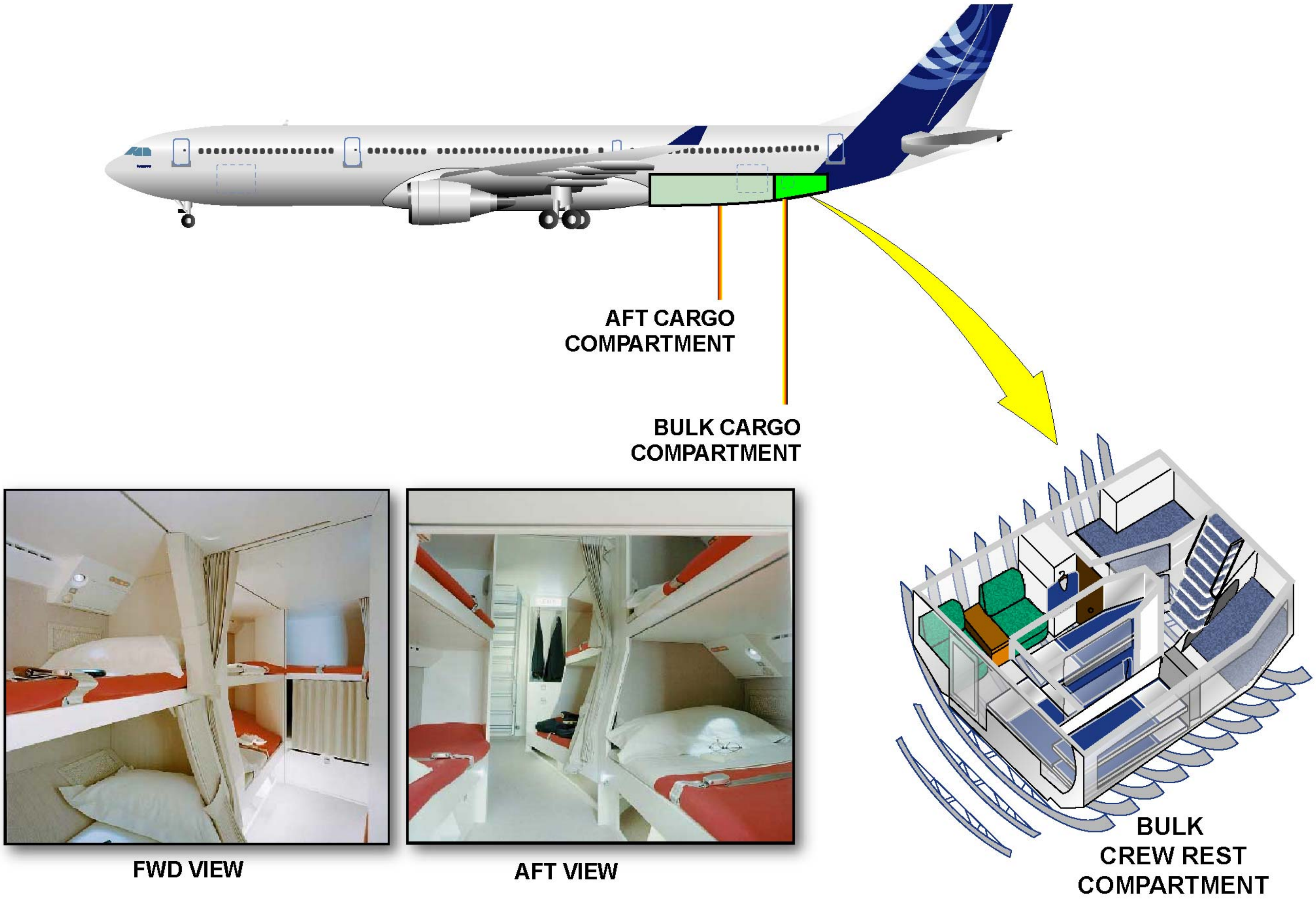
LDMCR COMPARTMENT

This Page Intentionally Left Blank

25 EQUIPMENT/FURNISHINGS SYSTEM PRESENTATION (1)

BCRC

The Bulk Crew Rest Compartment (BCRC) is installed in the bulk cargo compartment. Its size and equipment can be laid out according to the airline request. A staircase housing is located in the cabin above the compartment and the exit hatch on the cabin aisle. Lower and upper rest bunks are installed. Lower bunks without an upper bunk can be used as seats. Stowage compartments are located in the staircase to store emergency equipment.

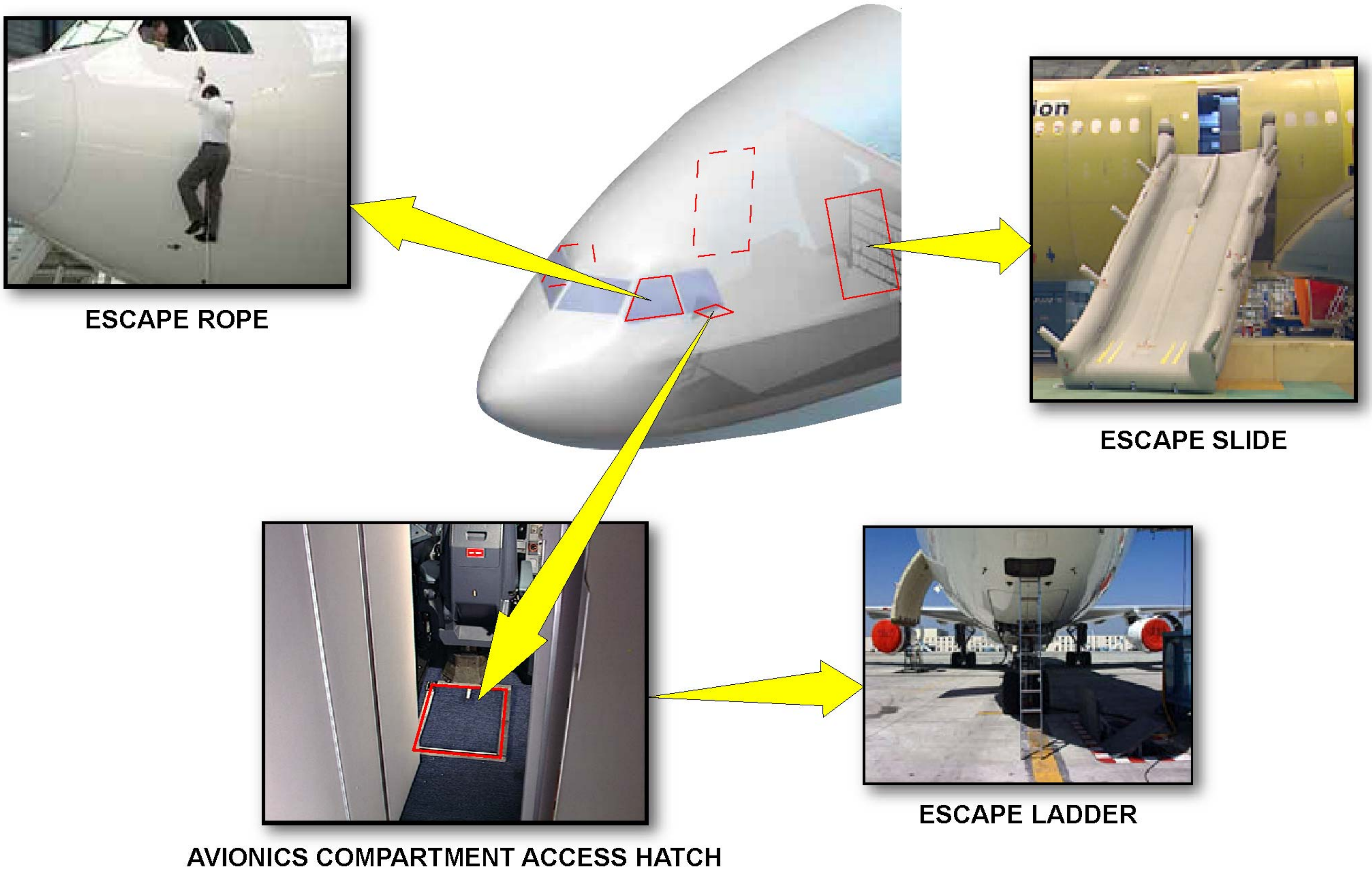

AFT CARGO COMPARTMENT
BULK CARGO COMPARTMENT
FWD VIEW
AFT VIEW
BULK CREW REST COMPARTMENT

BCRC

25 EQUIPMENT/FURNISHINGS SYSTEM PRESENTATION (1)

COCKPIT ESCAPE FACILITIES

If an emergency occurs, there are three possibilities for the cockpit crew to leave the aircraft:
- evacuation through the cabin and then use the passenger door escape slide facilities,
- evacuation through the sliding windows by using the escape rope,
- evacuation through the avionics compartment by using the access hatch and the escape ladder.

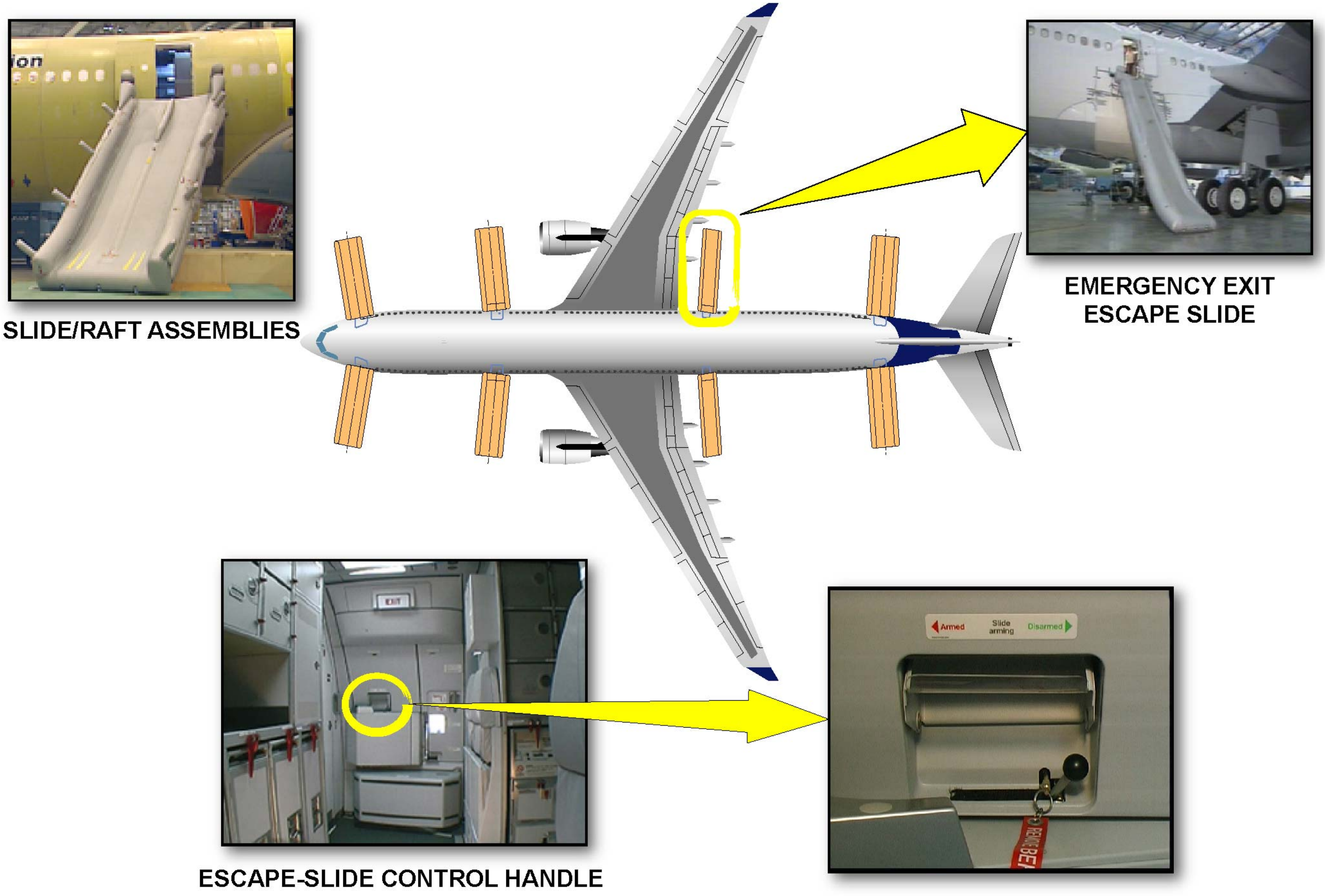


COCKPIT ESCAPE FACILITIES

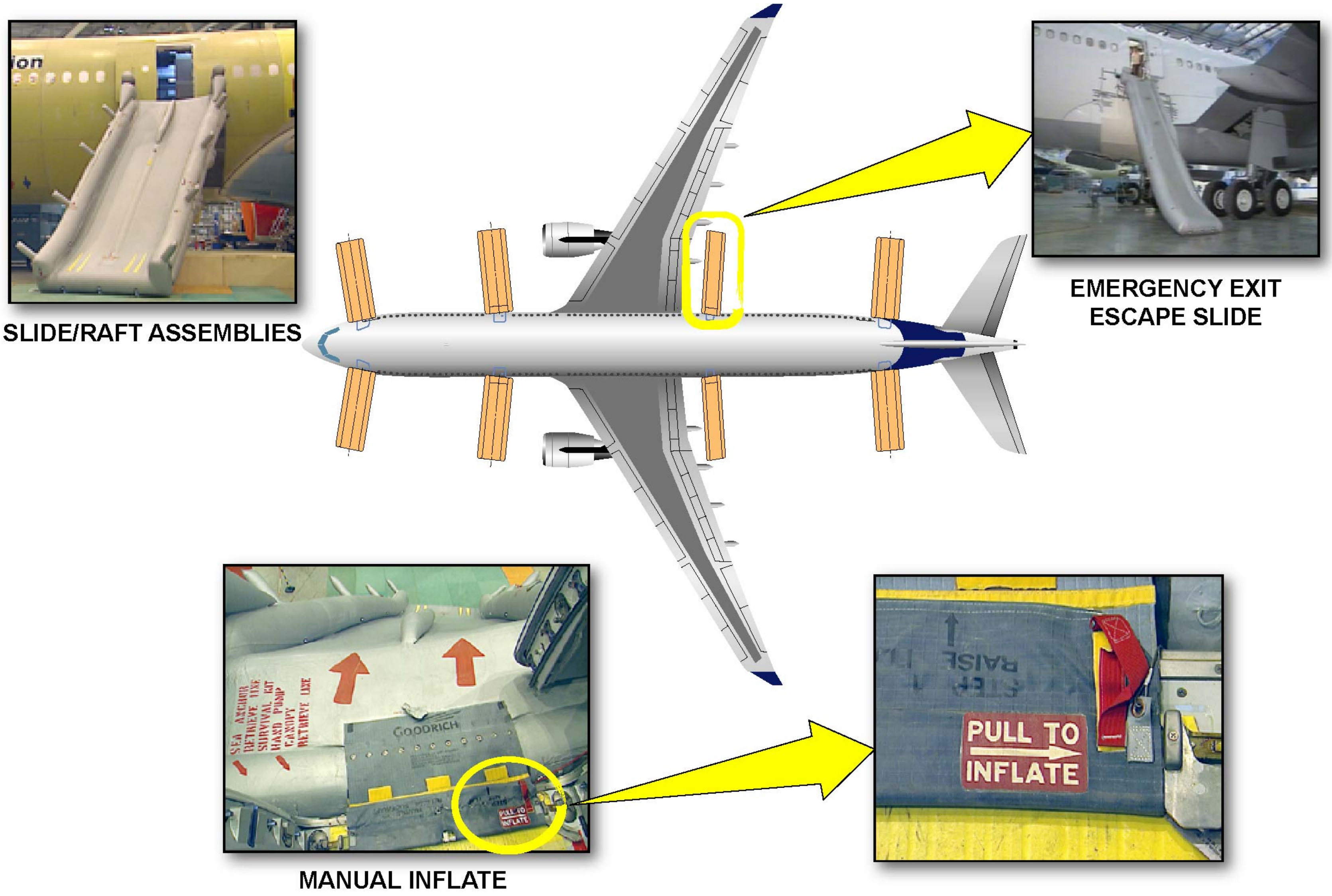
25 EQUIPMENT/FURNISHINGS SYSTEM PRESENTATION (1)

CABIN ESCAPE FACILITIES

The type "A" passenger doors can have escape slides or slide rafts. The type "1" emergency exits have escape slides. They are used for quick evacuation in case of emergency. Deployment of the slide/rafts is automatic when the door is opened with the evacuation system in the armed mode.
If the automatic slide inflation system fails, the slide/raft can be manually inflated.



CABIN ESCAPE FACILITIES



CABIN ESCAPE FACILITIES

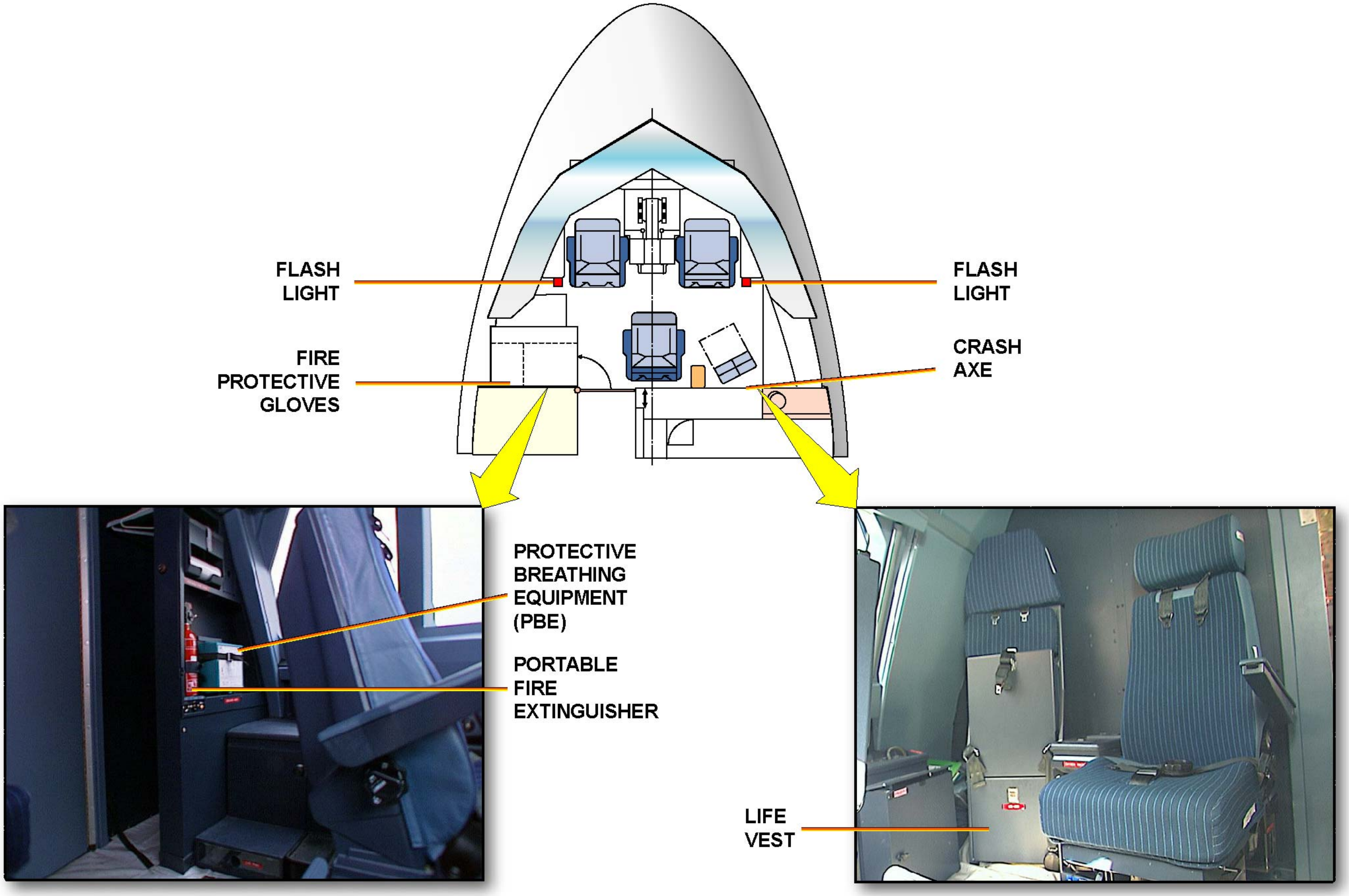
This Page Intentionally Left Blank

25 EQUIPMENT/FURNISHINGS SYSTEM PRESENTATION (1)

TYPICAL EMERGENCY EQUIPMENT

COCKPIT EMERGENCY EQUIPMENT

The standard cockpit emergency equipment components are:
- flash light,
- portable halon fire extinguisher,
- life vest for flight crew,
- Protective Breathing Equipment (PBE),
- crash axe,
- fireproof gloves.



TYPICAL EMERGENCY EQUIPMENT - COCKPIT EMERGENCY EQUIPMENT

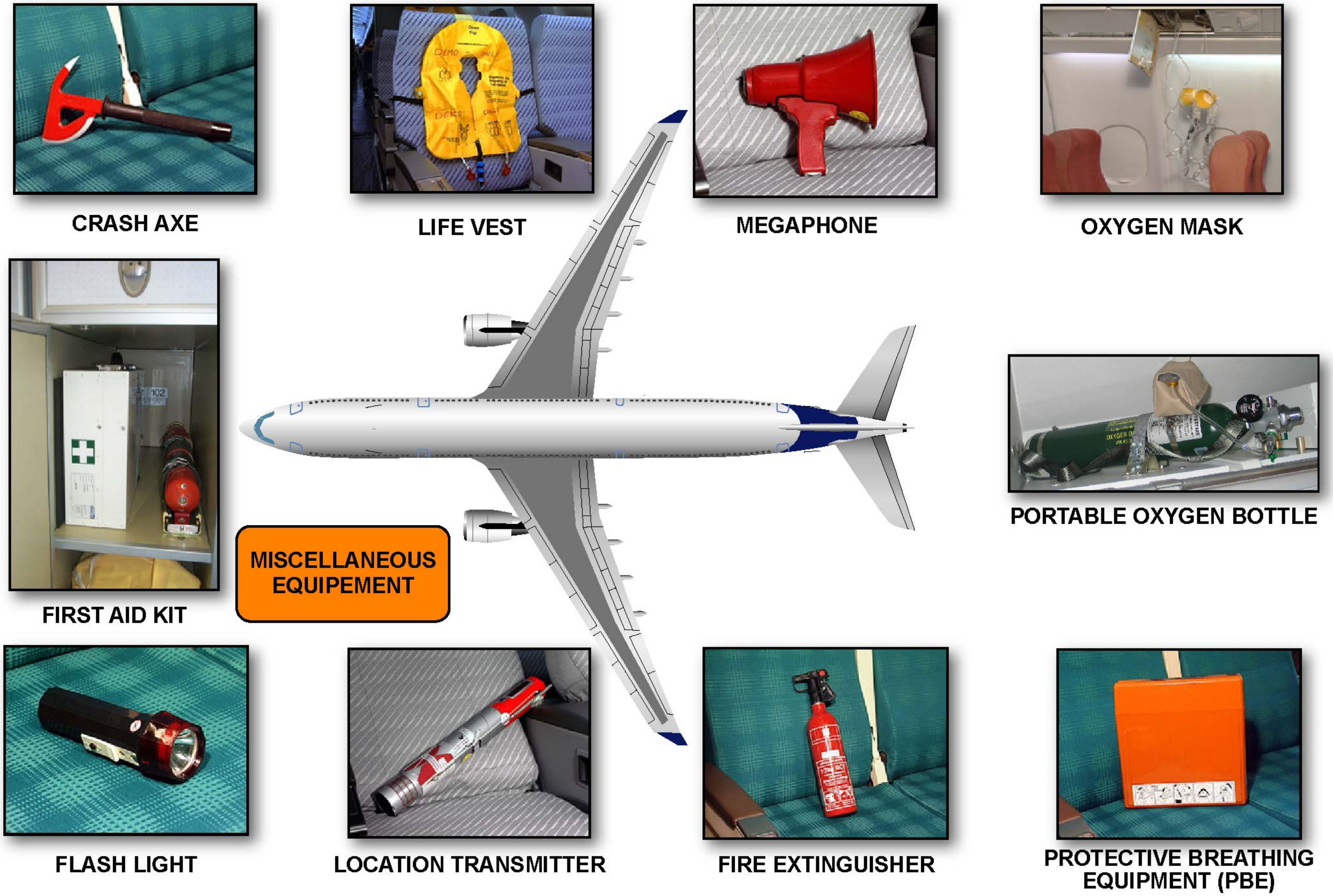
25 EQUIPMENT/FURNISHINGS SYSTEM PRESENTATION (1)

TYPICAL EMERGENCY EQUIPMENT (continued)

CABIN EMERGENCY EQUIPMENT

Emergency equipment is kept in different locations in the aircraft with easy access for immediate use. Typical emergency equipment items are:
- crash axe,
- life vest,
- megaphone,
- oxygen mask,
- portable oxygen bottle,
- PBE,
- fire extinguisher,
- emergency location transmitter,
- flash light,
- first aid kit and medical kit.

Other items can also be installed, such as blankets, pillows, gloves, a wheelchair, a dangerous goods kit, a security mirror, a crowbar, a signaling kit or a baby survival raft.



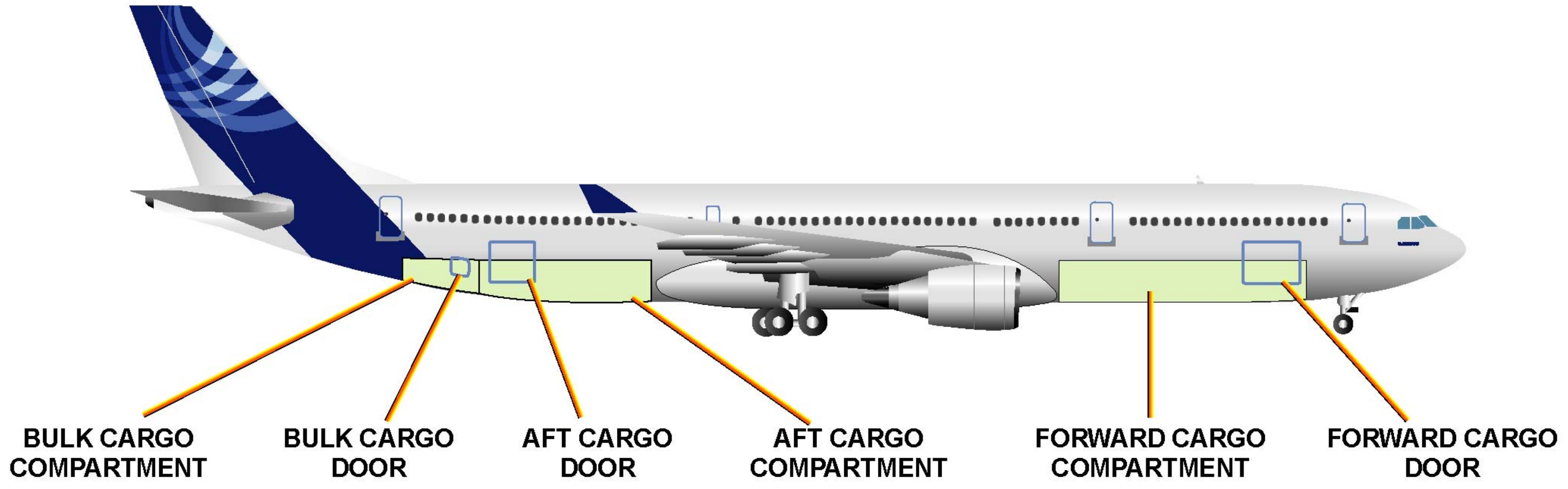
TYPICAL EMERGENCY EQUIPMENT - CABIN EMERGENCY EQUIPMENT

25 EQUIPMENT/FURNISHINGS SYSTEM PRESENTATION (1)

LOWER DECK CARGO COMPARTMENT

The aircraft has three lower deck cargo compartments in the lower part of the fuselage. They are:
- the forward cargo compartment,
- the aft cargo compartment,
- the bulk cargo compartment.

The forward and aft cargo compartments have an independently operated semi-automatic Cargo Loading System (CLS) and can accommodate cargo in containers or on pallets. The bulk cargo compartment is designed for transportation of bulk cargo, passenger luggage and live animals.
Access to the forward, aft and bulk cargo compartments is gained through doors located on the right hand side of the fuselage. Two hydraulically operated outwards opening doors give access to the forward and aft cargo compartments. The bulk cargo has one manually operated door, which opens inwards.



G6B08031 - G10T4T0 - FM25P9000000001

LOWER DECK CARGO COMPARTMENT

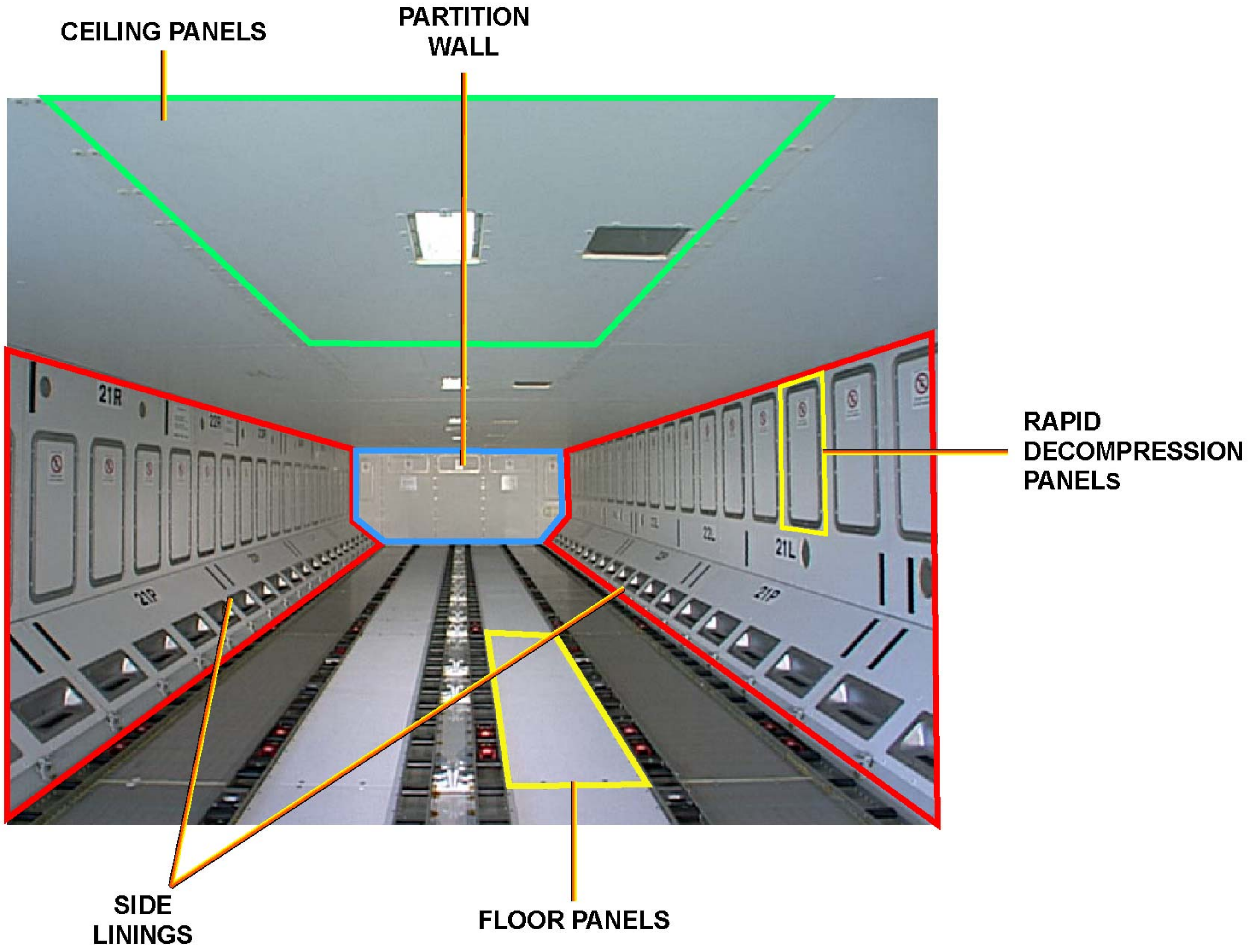
25 EQUIPMENT/FURNISHINGS SYSTEM PRESENTATION (1)

LOWER DECK CARGO COMPARTMENT (continued)

LOWER DECK CARGO COMPARTMENT INTERIOR AND LINING

The inside of the cargo compartments has:
- floor panels,
- ceiling panels,
- side linings,
- partition walls.

All the linings and panels are sealed to give a fully sealed compartment. Rapid decompression panels, blow in, blow out panels are installed in the linings to prevent damage from differential pressure. In case of decompression in the cabin or in the cargo compartment, they equalize the pressure in both sections, to avoid damage to the structure.



LOWER DECK CARGO COMPARTMENT - LOWER DECK CARGO COMPARTMENT INTERIOR AND LINING

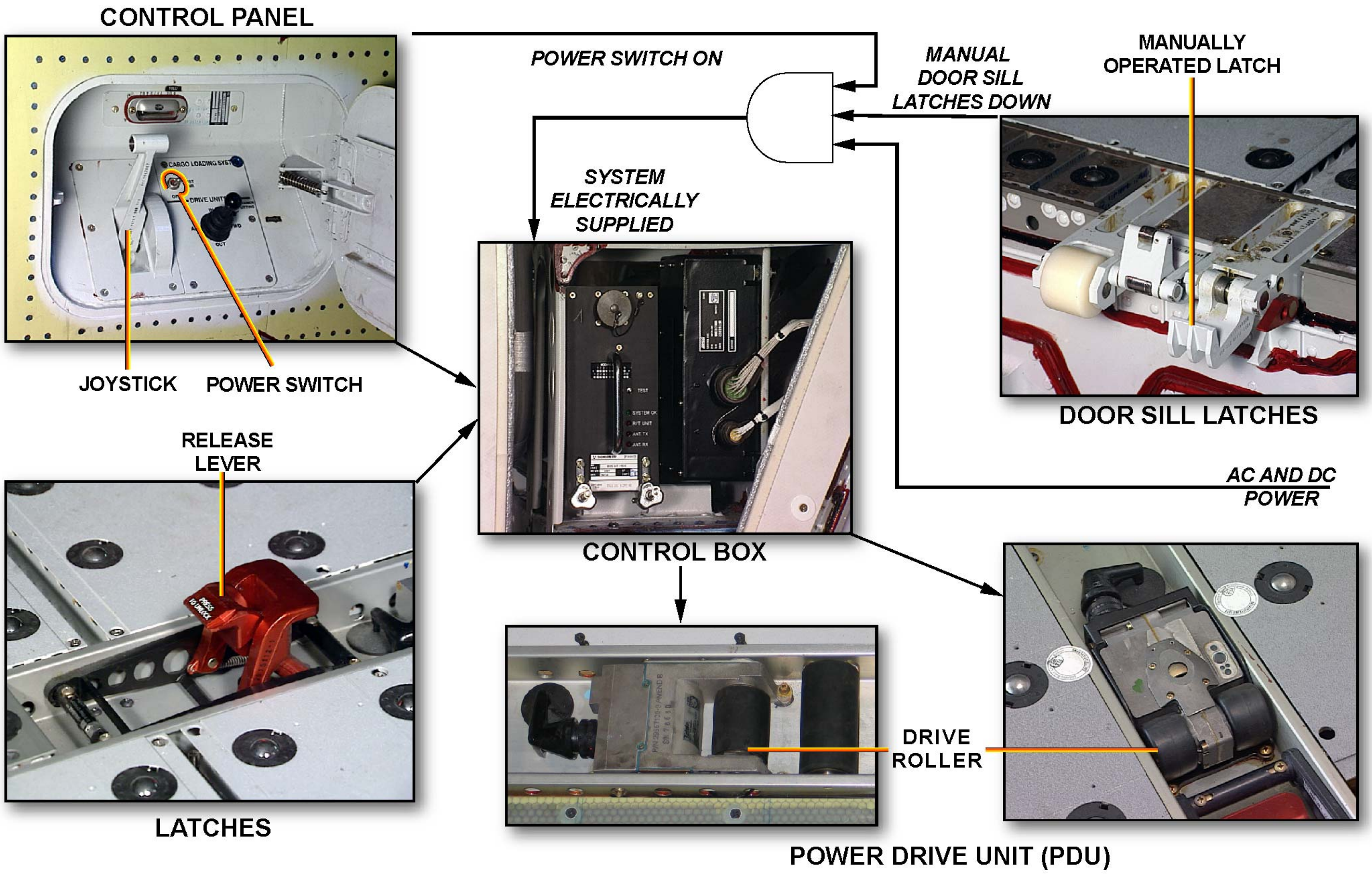
25 EQUIPMENT/FURNISHINGS SYSTEM PRESENTATION (1)

LOWER DECK CARGO COMPARTMENT (continued)

LOWER DECK CLS

The semi-automatic CLS of the forward and aft cargo compartments is used to load, unload and move the ULDs. These ULDs can be pallets or containers of different sizes. One person can operate the CLS. If there is no electrical power available, it is possible to manually load or unload. The semi-automatic cargo loading systems of the forward and the aft lower deck cargo compartments are similar in construction and work independently. The CLS includes:
- control panel installed adjacent to the cargo compartment door,
- control box,
- Power Drive Units (PDUs),
- proximity switches located on the different latches.

For the powered loading operation, the power switch must be in the ON position. The AC/DC power is available and the manual doorsill latch must be in the lowered position. The control panel sends electrical signals through the control box to the applicable PDUs. The PDUs move the ULDs in the necessary direction and to their loading positions. When a ULD is in the correct loading position, you must lock the latch manually.

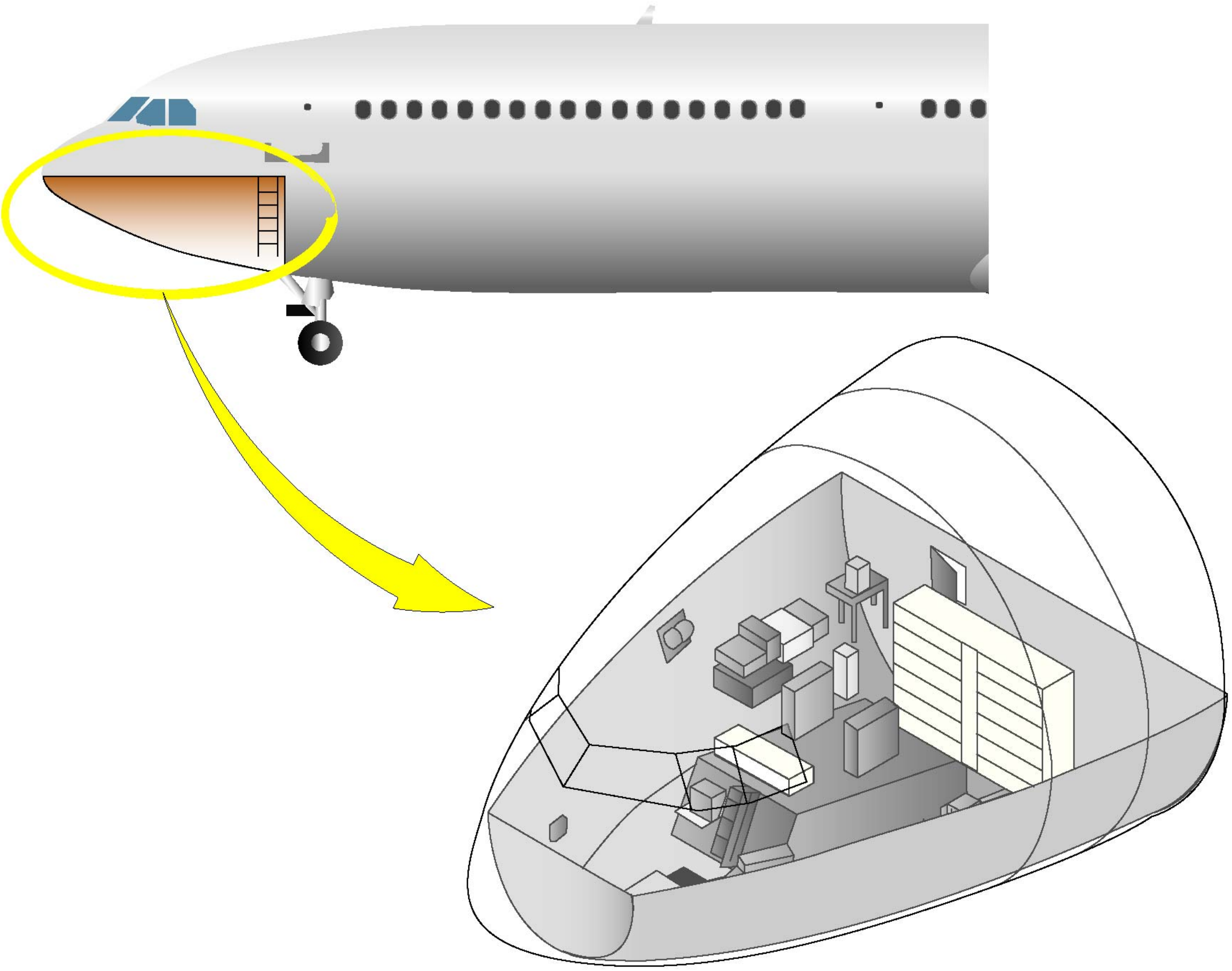


LOWER DECK CARGO COMPARTMENT - LOWER DECK CLS

25 EQUIPMENT/FURNISHINGS SYSTEM PRESENTATION (1)

AVIONICS COMPARTMENT

The avionics compartment is located in the underfloor nose section. The avionics compartment service ladder can be used to enter and leave the aircraft while performing maintenance procedures. In case of an emergency on ground, the flight crew can use the service ladder when they leave the aircraft through the avionics compartment.



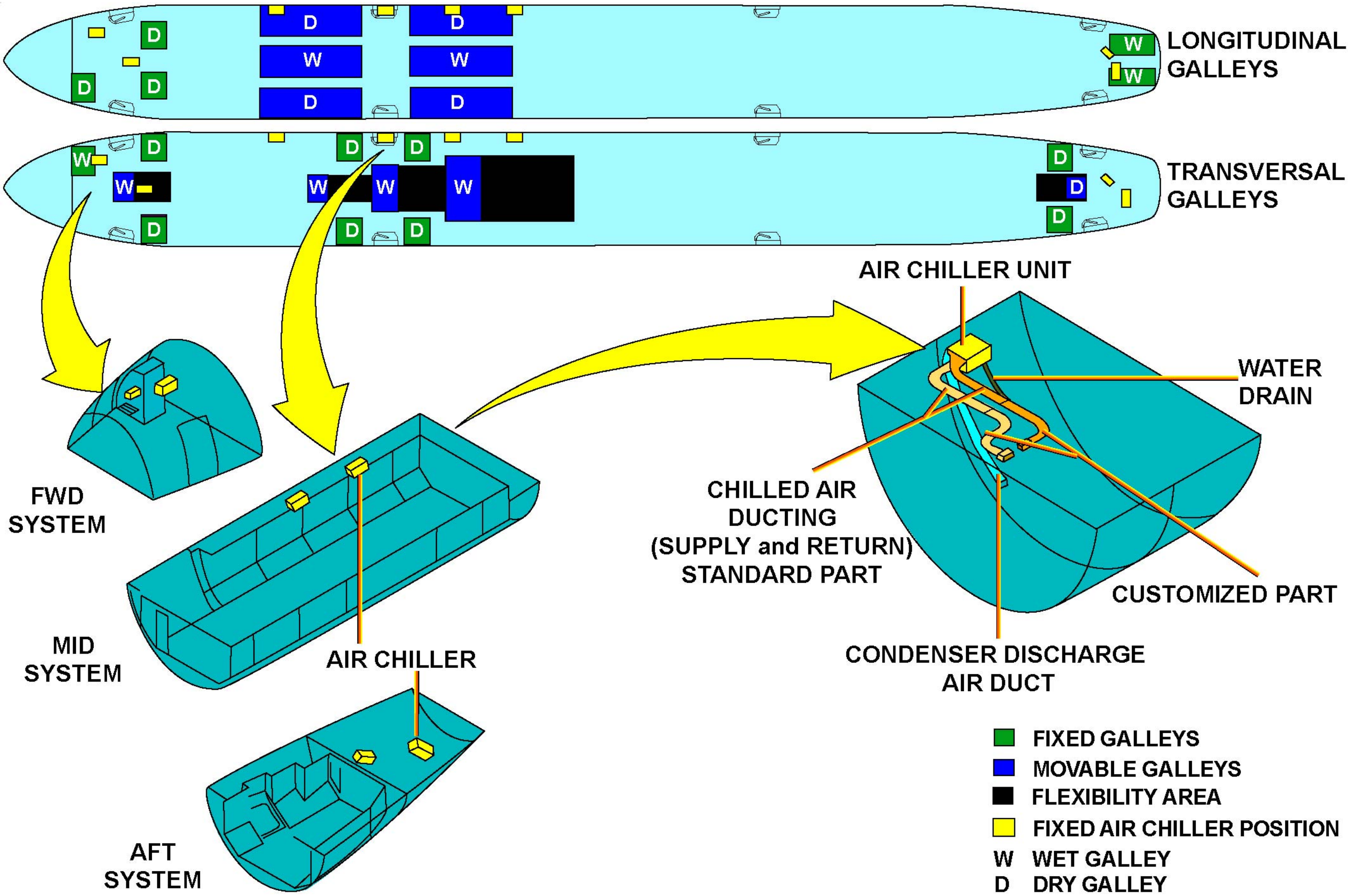
AVIONICS COMPARTMENT

G6B08031 - G10T4T0 - FM25P9000000001

25 EQUIPMENT/FURNISHINGS SYSTEM PRESENTATION (1)

GALLEY TROLLEY COMPARTMENT COOLING SYSTEM (AIR CHILLER UNIT)

At most galley locations freon type chilled air systems are used to cool the meal trolleys. The galley cooling system has several air chiller units that operate independently. Several fixed air chiller positions have been defined. There is a forward, middle or aft system, which can be installed according to customers needs. The chilled areas are predefined to avoid an excessive influence on temperature, humidity and noise. Not more than 6 units should be installed in the aircraft. The air chiller is normally installed underfloor. It is composed of:
- an air chiller unit,
- a water drain,
- a condenser discharge air duct,
- chilled air ducting,
- a customized part.

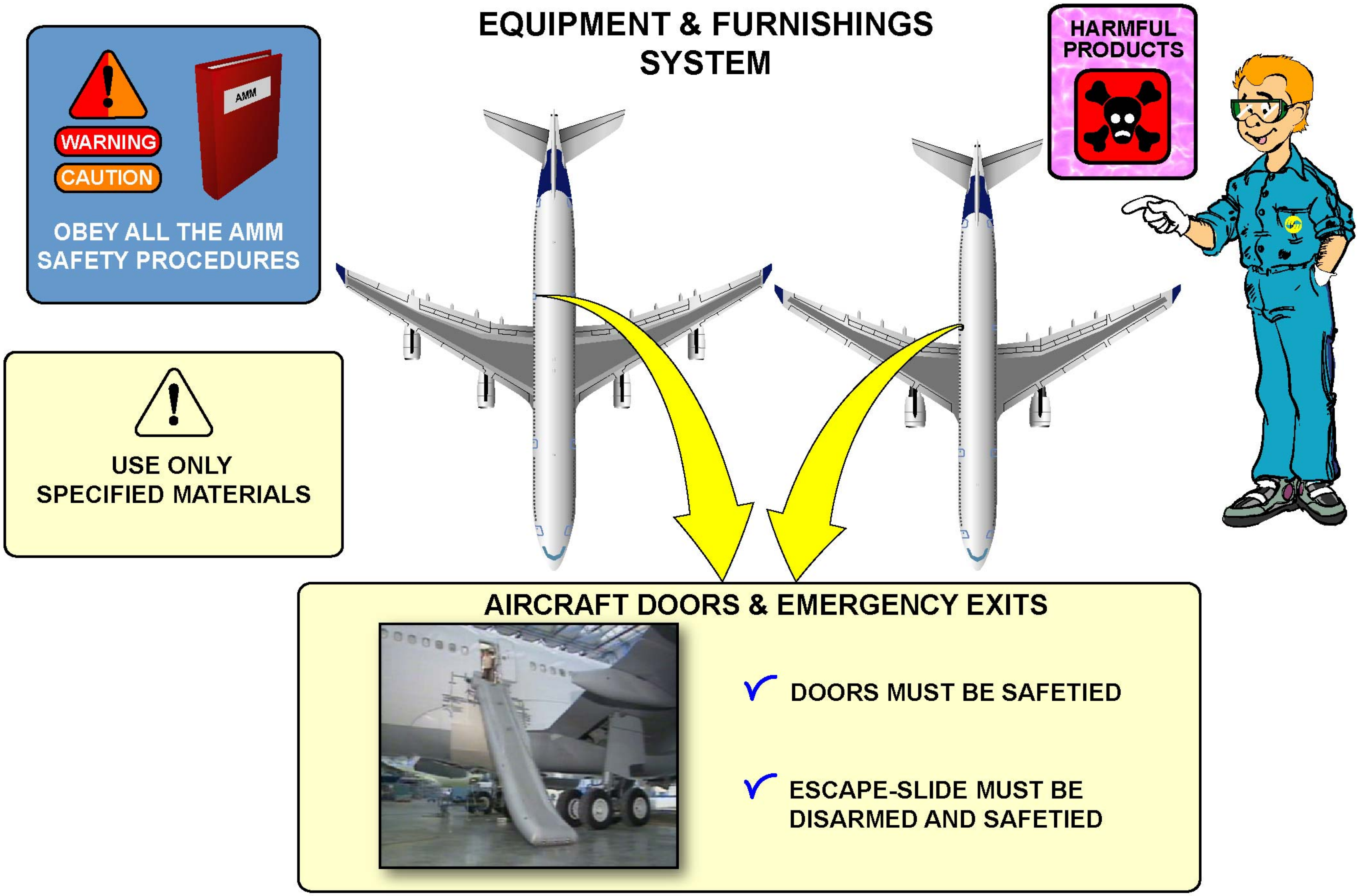


GALLEY TROLLEY COMPARTMENT COOLING SYSTEM (AIR CHILLER UNIT)

25 EQUIPMENT/FURNISHINGS SYSTEM PRESENTATION (1)

SAFETY PRECAUTIONS

When you work on aircraft, make sure that you obey all the AMM safety procedures. This will prevent injury to persons and/or damage to the aircraft. Here is an overview of the main safety precautions relative to the equipment & furnishings system. Use only the specified materials and obey the instructions from the manufacturers. Other materials can cause damage to the surface protection of the components and the related area. Before you start working on the escape-slide, make sure that the door is safetied. This prevents sudden movement of the door and accidental deployment of the escape-slide, which can cause injury and/or damage. Before opening the door or the emergency exit, make sure that the escape-slide system is disarmed and safetied. This will prevent inadvertent inflation of the slide pack-assembly. Use solvents/cleaning agents, sealants and other special materials only with a good flow of air through the work area. Those materials being poisonous, flammable and skin irritant, put on protective clothing, rubber gloves, goggles and mask.



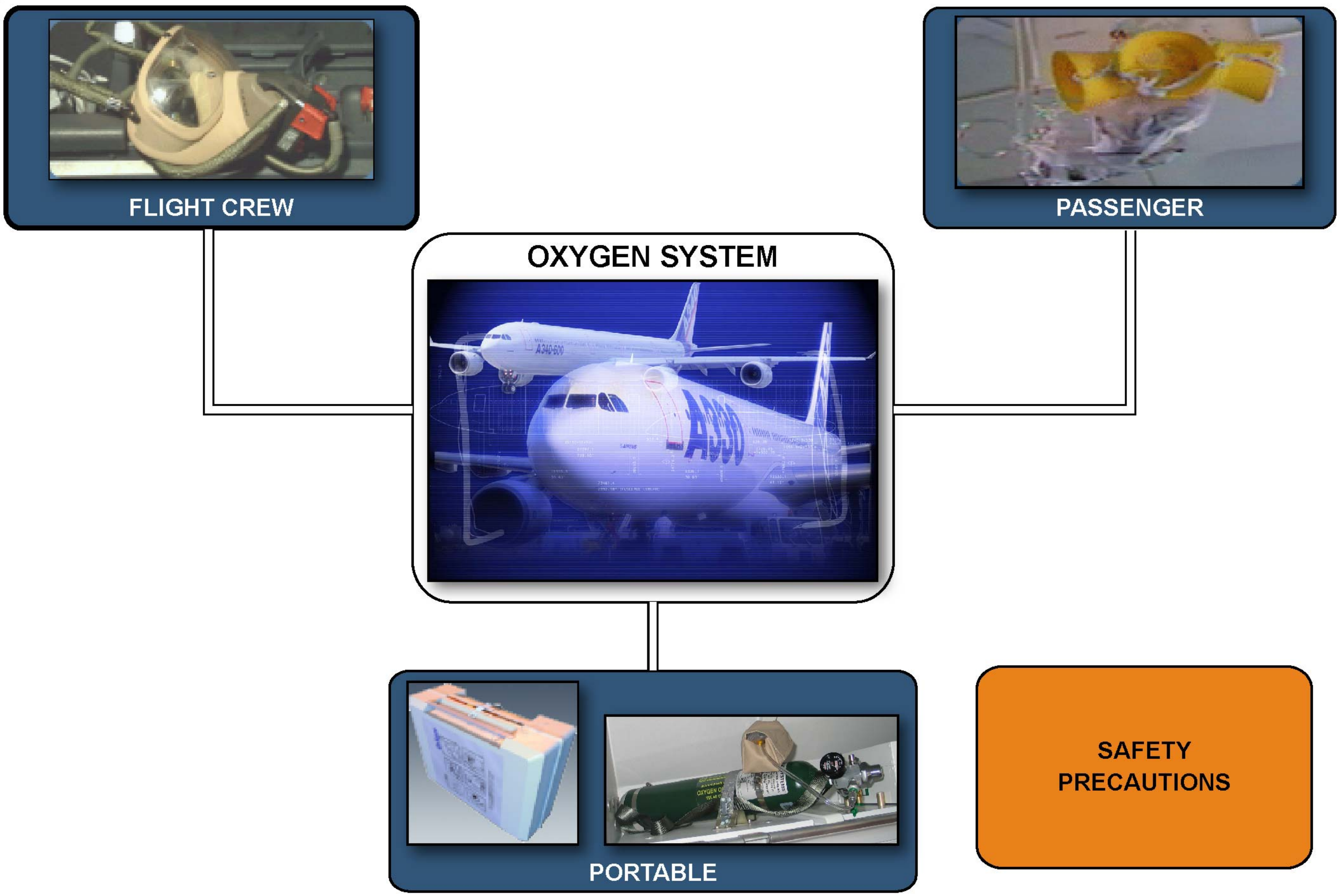
SAFETY PRECAUTIONS

35 OXYGEN SYSTEM PRESENTATION (1)

GENERAL

The oxygen system supplies crew and passengers with oxygen in case of cabin depressurization. The oxygen system has three different subsystems:
- the crew oxygen system,
- the passenger oxygen system,
- the portable oxygen system.

When you work on aircraft, you must obey all the safety procedures listed in the AMM.



GENERAL

G6B08031 - G10T4T0 - FM35P4000000001

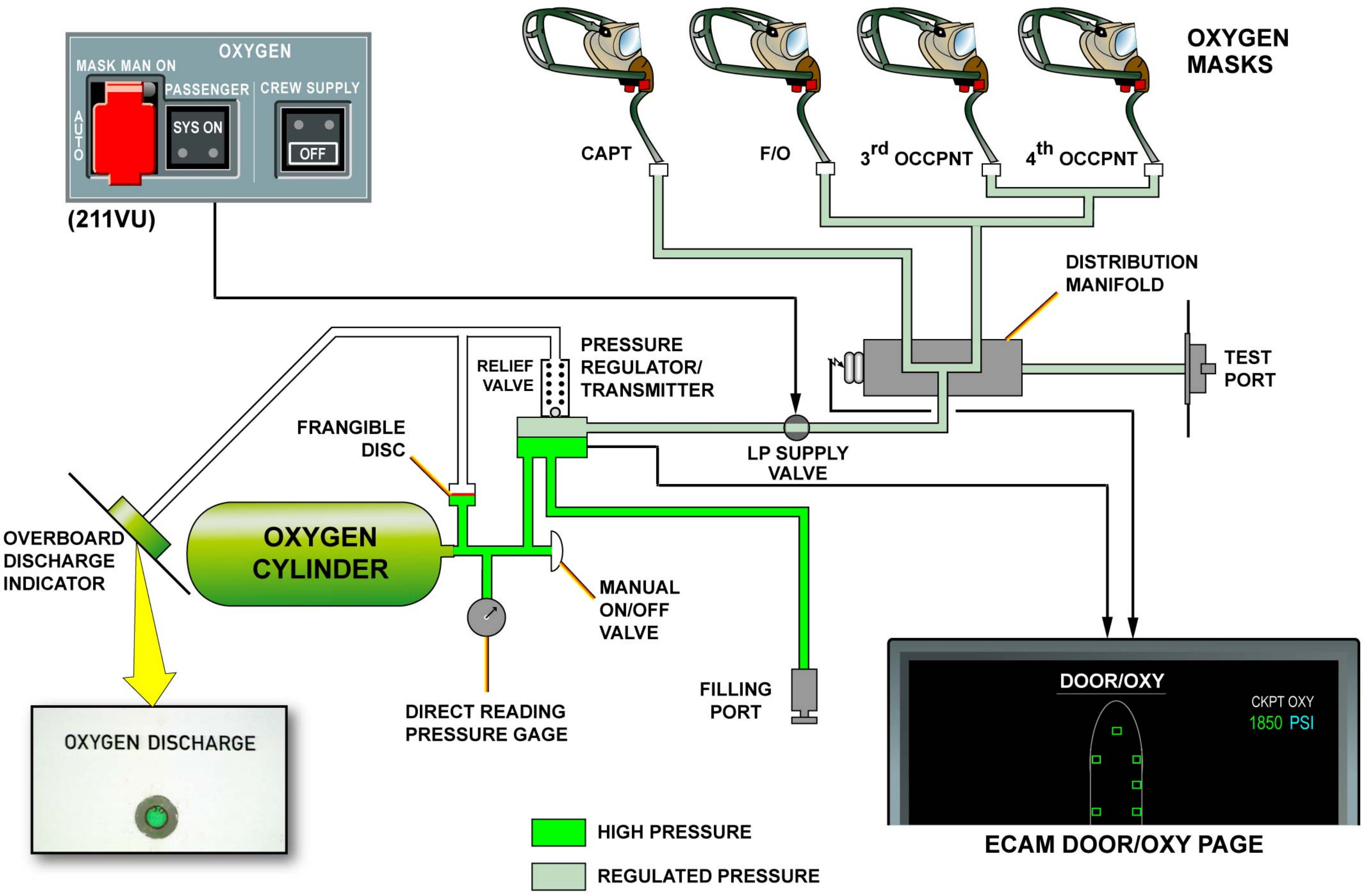
35 OXYGEN SYSTEM PRESENTATION (1)

COCKPIT CREW OXYGEN SYSTEM

The flight crew oxygen system supplies the flight crew members with oxygen in the case of loss of cabin pressure altitude or emission of smoke or toxic gas.

CREW OXYGEN SUPPLY

The flight crew oxygen is stored in a High Pressure (HP) oxygen cylinder. This cylinder is located in the avionics compartment and placed in a cradle. The HP oxygen cylinder can be isolated for maintenance by a manual ON/OFF valve. The oxygen is supplied to the flight crew stations through a distribution circuit. HP is reduced to LP by the pressure regulator/transmitter. LP oxygen flows is supplied via the LP supply valve to the distribution manifold and finally to the mask stowage boxes located in the cockpit. Each mask stowage box has a full face quick donning mask. The LP supply valve can be switched off from the cockpit for maintenance action as well as in ground configuration. The system is protected if an overpressure occurs in a high or low-pressure circuit. The overpressure is vented overboard. The oxygen pressure condition is indicated on the DOOR/OXY page of the ECAM system. A test port is used for distribution leakage tests and a filling port is used for the refilling of oxygen without removal of the oxygen cylinder.



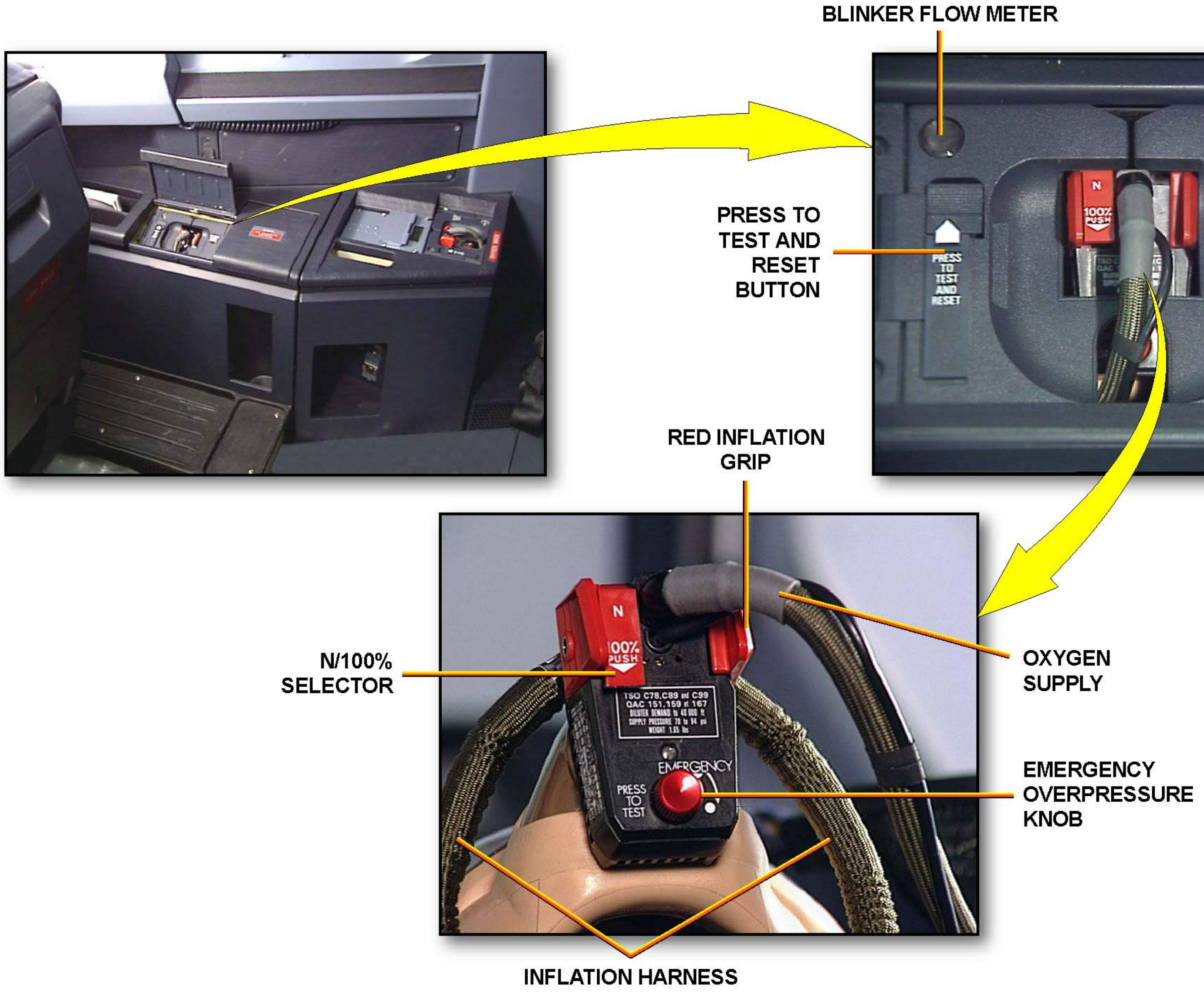
COCKPIT CREW OXYGEN SYSTEM - CREW OXYGEN SUPPLY

35 OXYGEN SYSTEM PRESENTATION (1)

COCKPIT CREW OXYGEN SYSTEM (continued)

CREW OXYGEN MASKS

The pilots oxygen masks are located in a storage box in both consoles on the side. To use the mask the crew member squeezes the red grips to pull the mask out of the box, and this action causes the mask harness to inflate and to put the mask on. With the mask in position and the red grips released, the oxygen mask will be supplied with oxygen. A mask mounted regulator supplies a mixture of air and oxygen or pure oxygen, or gives emergency pressure control. With the regulator set to NORMAL, the user breathes a mixture of cabin air and oxygen up to the cabin altitude at which the regulator supplies 100% oxygen on demand. The user can select 100%, in that case the regulator supplies pure oxygen at all cabin altitudes on demand. Depending on the situation, the user can turn the EMERGENCY rotating knob to receive pure oxygen under pressure. The emergency rotating knob will also be used for a specific system test by pushing it. A microphone is installed in the mask. A flow blinker indicates oxygen flow. The PRESS TO TEST AND RESET button is used for the oxygen flow test as well as to reset the oxygen mask test.



COCKPIT CREW OXYGEN SYSTEM - CREW OXYGEN MASKS

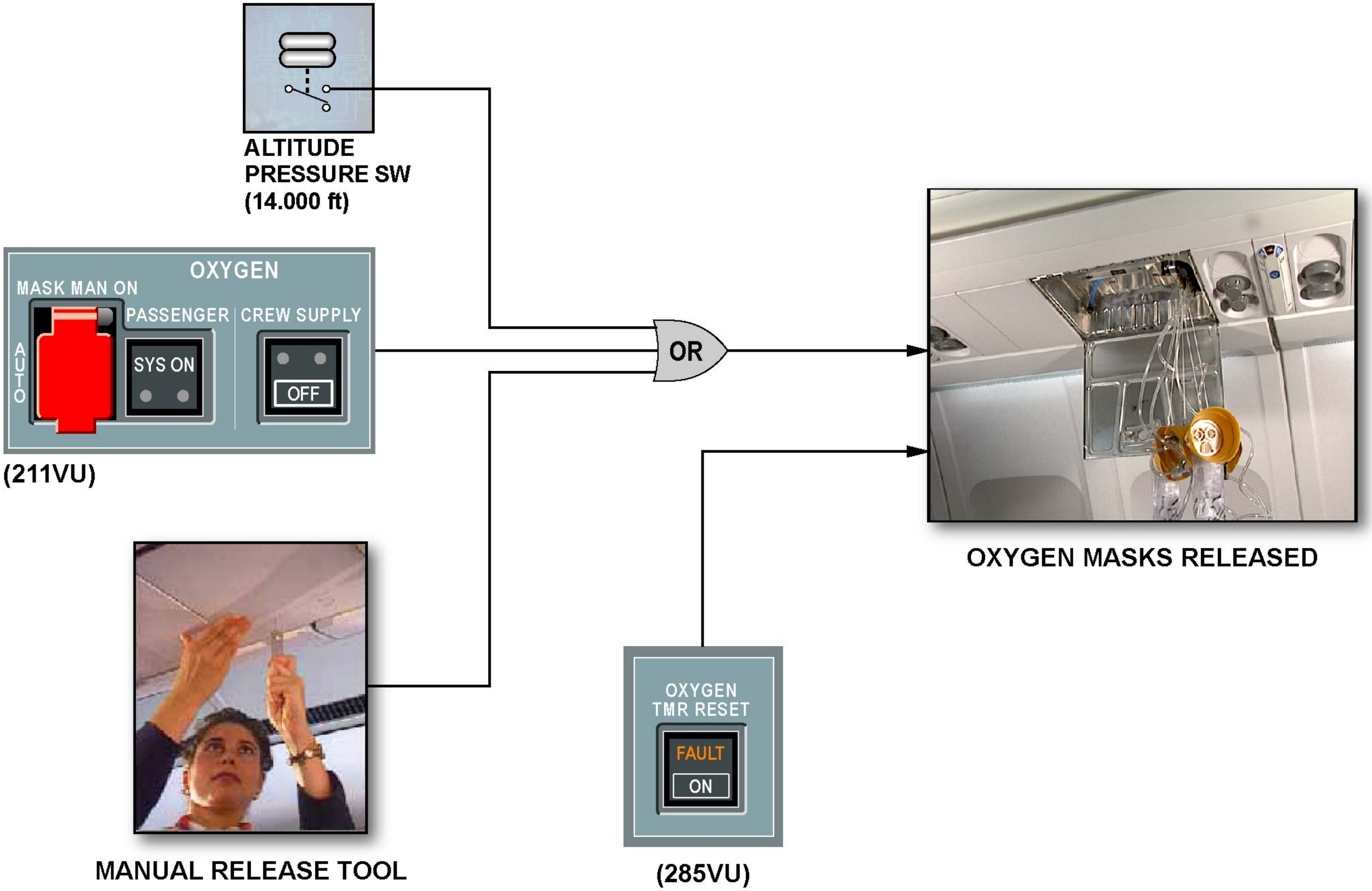
35 OXYGEN SYSTEM PRESENTATION (1)

CABIN OXYGEN SYSTEM

CHEMICAL OXYGEN SYSTEM

Oxygen masks are released automatically with a cabin depressurization and an aircraft altitude over 14.000 ft or manually anytime in flight or on ground via the cockpit oxygen panel or with a manual release tool. The passenger oxygen system supplies cabin occupants with oxygen in the case of loss of cabin pressure altitude. The container doors open electrically. When pulling the mask towards the users face, the oxygen generator is activated and supplies pure oxygen to the masks for a limited time. After operation, the system has to be reset by pushing the OXYGEN TiMeR RESET P/B on the maintenance panel in order to return the electrical activation system to normal condition.
The chemical generators are installed in special containers. These containers are located above the passenger seats, in the lavatories galleys working areas and at the cabin attendant stations.

NOTE: After activation, used chemical generators have to be replaced. An operational test of the passenger oxygen system is done.



CABIN OXYGEN SYSTEM - CHEMICAL OXYGEN SYSTEM

CHEMICAL GENERATOR

ABOVE PASSENGER SEAT

IN THE LAVATORIES

AT THE CABIN
ATTENDANT STATIONS

CABIN OXYGEN SYSTEM - CHEMICAL OXYGEN SYSTEM

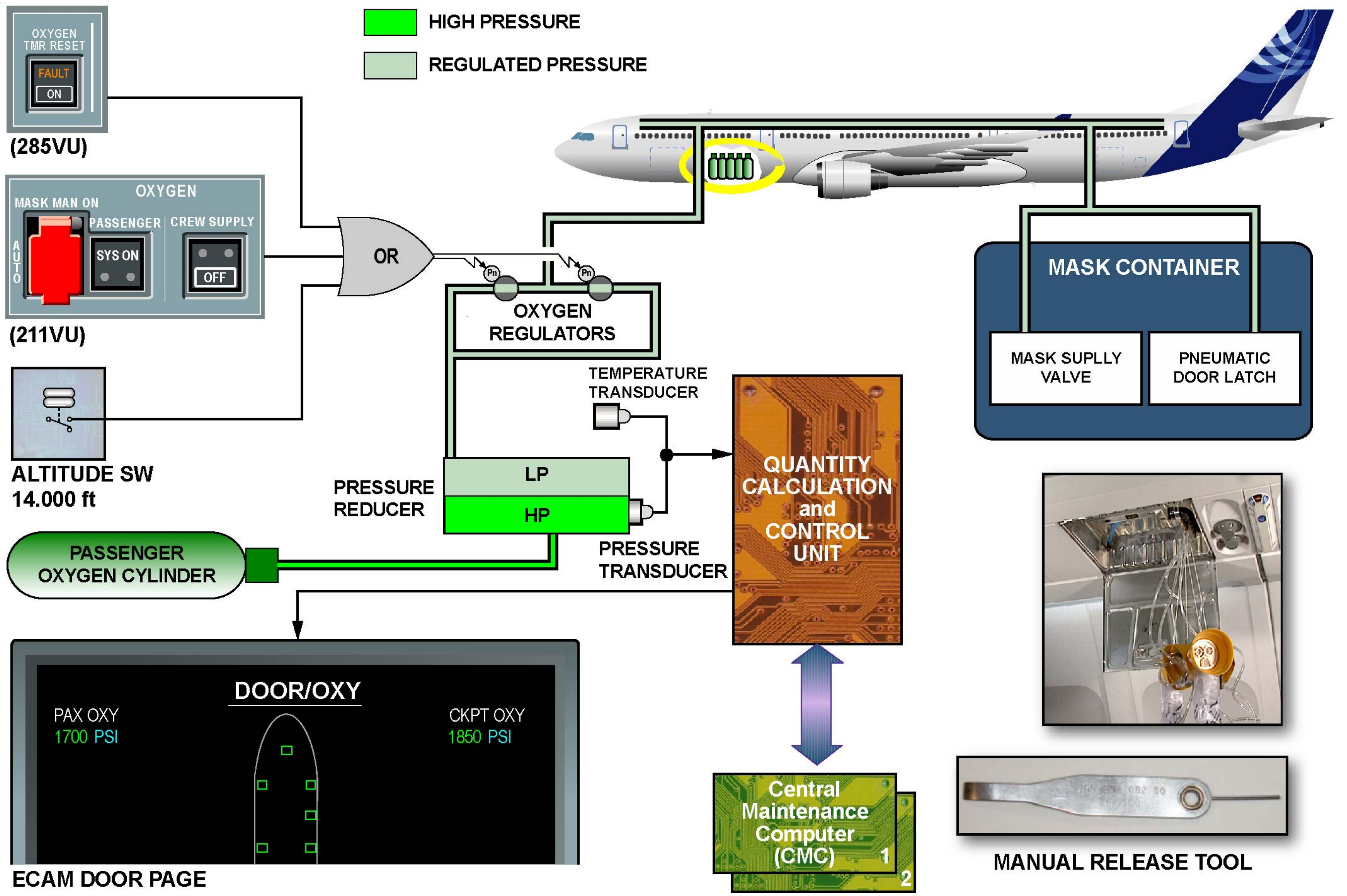
This Page Intentionally Left Blank

35 OXYGEN SYSTEM PRESENTATION (1)

CABIN OXYGEN SYSTEM (continued)

GASEOUS OXYGEN SYSTEM (OPTIONAL)

The passenger gaseous oxygen system supplies oxygen to each oxygen container in case of an emergency. The rate of the oxygen flow depends on the altitude, down to zero at 10.000 ft (3.050 m).
HP oxygen is kept in oxygen cylinder assemblies located behind sidewall linings in the FWD cargo compartment. The standard system has 5 oxygen cylinders, plus up to 13 additional oxygen cylinders can be installed at airline request. When the cabin pressure decreases to a pressure equivalent to 14.000 ft (4.300 m) the altitude switch closes. This starts the automatic operation of the oxygen system.
The oxygen regulators open and supply a regulated fllow to the two main supply lines. The oxygen masks container doors open pneumatically and the masks fall down. Oxygen only flows to the masks, which are pulled down. The MASK MANual ON P/B on the OXYGEN panel can be pushed at any time to manually start the operation of the oxygen system.
After operation, the system can be reset by pushing the OXYGEN TMR RESET P/B, this brings the passenger oxygen system back to the initial configuration and the oxygen regulators will close. The pressure reducer transmitter and the temperature transducer send signals to the quantity calculation and control unit. The quantity calculation and control unit sends a temperature adjusted signal to the ECAM System Display, which shows the crew the pressure in the oxygen cylinders. It is also connected to the Central Maintenance Computer for failures monitoring and system test.



CABIN OXYGEN SYSTEM - GASEOUS OXYGEN SYSTEM (OPTIONAL)

G6B08031 - G10T4T0 - FM35P4000000001

35 OXYGEN SYSTEM PRESENTATION (1)

PORTABLE OXYGEN SYSTEM

The portable oxygen equipment lets the user move freely in the aircraft in case of fire or emission of smoke or noxious gas. The portable oxygen equipment protects the eyes and the respiratory system in case of fire or emission of smoke or noxious gas. It gives freedom of movement to extinguish a fire or to supply emergency oxygen if the fixed oxygen system does not work.

One smoke hood is located in the cockpit on the rear left lateral panel, the others are located at the cabin attendant stations. Each hood is stored under vacuum in a special container. It can be donned in less than 10 seconds and will supply oxygen to the person during 15 minutes.

The oxygen cylinders are located in the cockpit, at the cabin attendant stations and in several locations in the cabin, immediately available to the cabin attendants. They have continuous flow type masks and supply first aid oxygen to the passengers and to supply oxygen to the cabin attendants.

PROTECTIVE BREATHING EQUIPMENT

PORTABLE OXYGEN BOTTLE WITH MASK

EMISSION OF SMOKE

FREEDOM OF MOVEMENT POSSIBLE

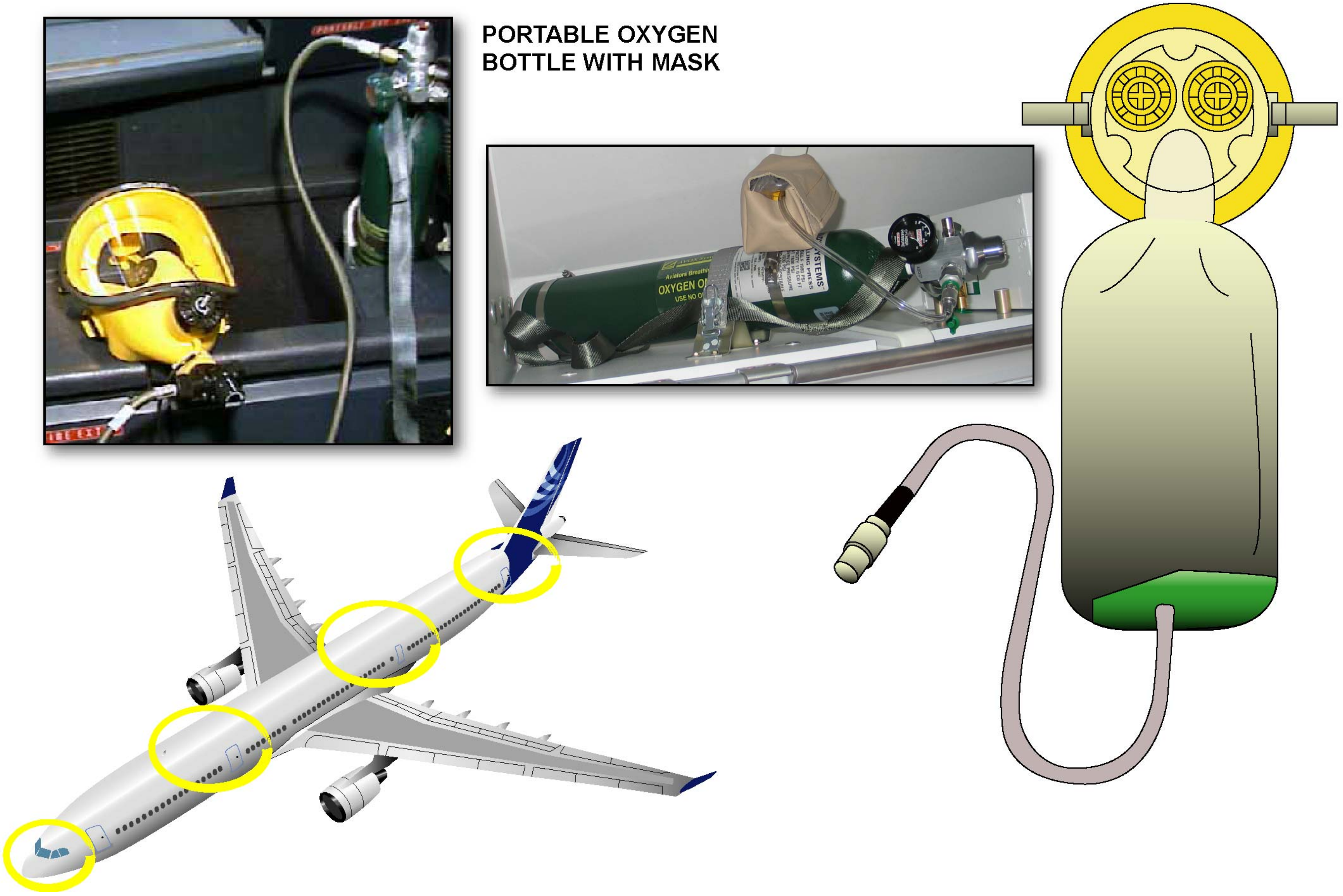
PORTABLE OXYGEN SYSTEM

HOOD IN THE COCKPIT

HOOD AT THE ATTENDANT STATIONS

PROTECTIVE BREATHING EQUIPMENT

PORTABLE OXYGEN SYSTEM



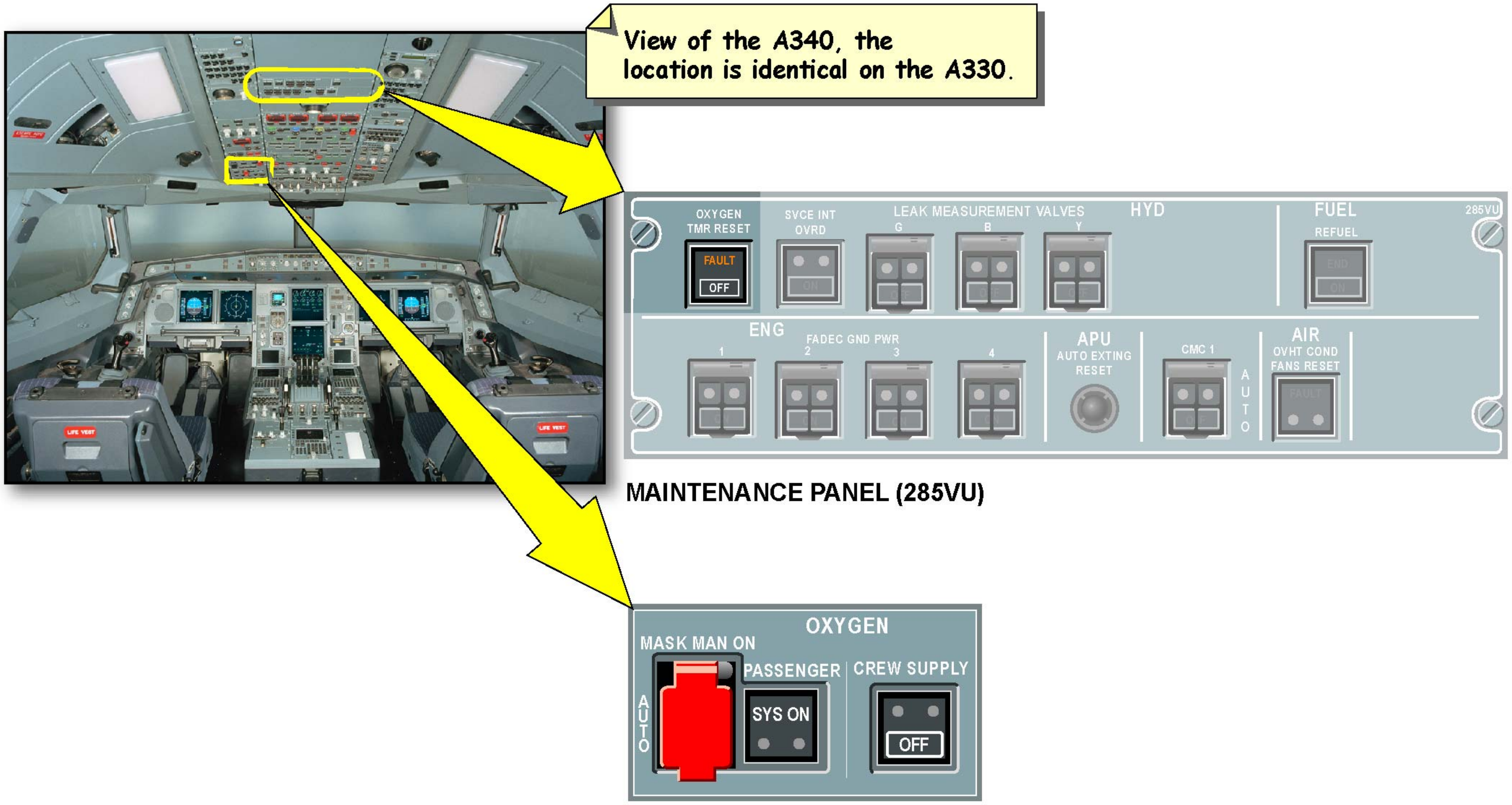
PORTABLE OXYGEN SYSTEM

G6B08031 - G10T4T0 - FM35P4000000001

35 OXYGEN SYSTEM PRESENTATION (1)

CONTROL AND INDICATING

The OXYGEN control panel for crew and passengers, is located on the cockpit overhead panel. The CREW SUPPLY P/B in OFF position shuts off the supply from the oxygen cylinder to the crew masks. The MASK MAN ON P/B electrically controls the opening of the oxygen container doors. This will be indicated by the SYStem ON light. To reset the passenger oxygen system the TMR RESET P/B on the maintenance panel has to be pressed. The P/B also indicates a fault in the system, when the FAULT light comes in amber.



(211VU)

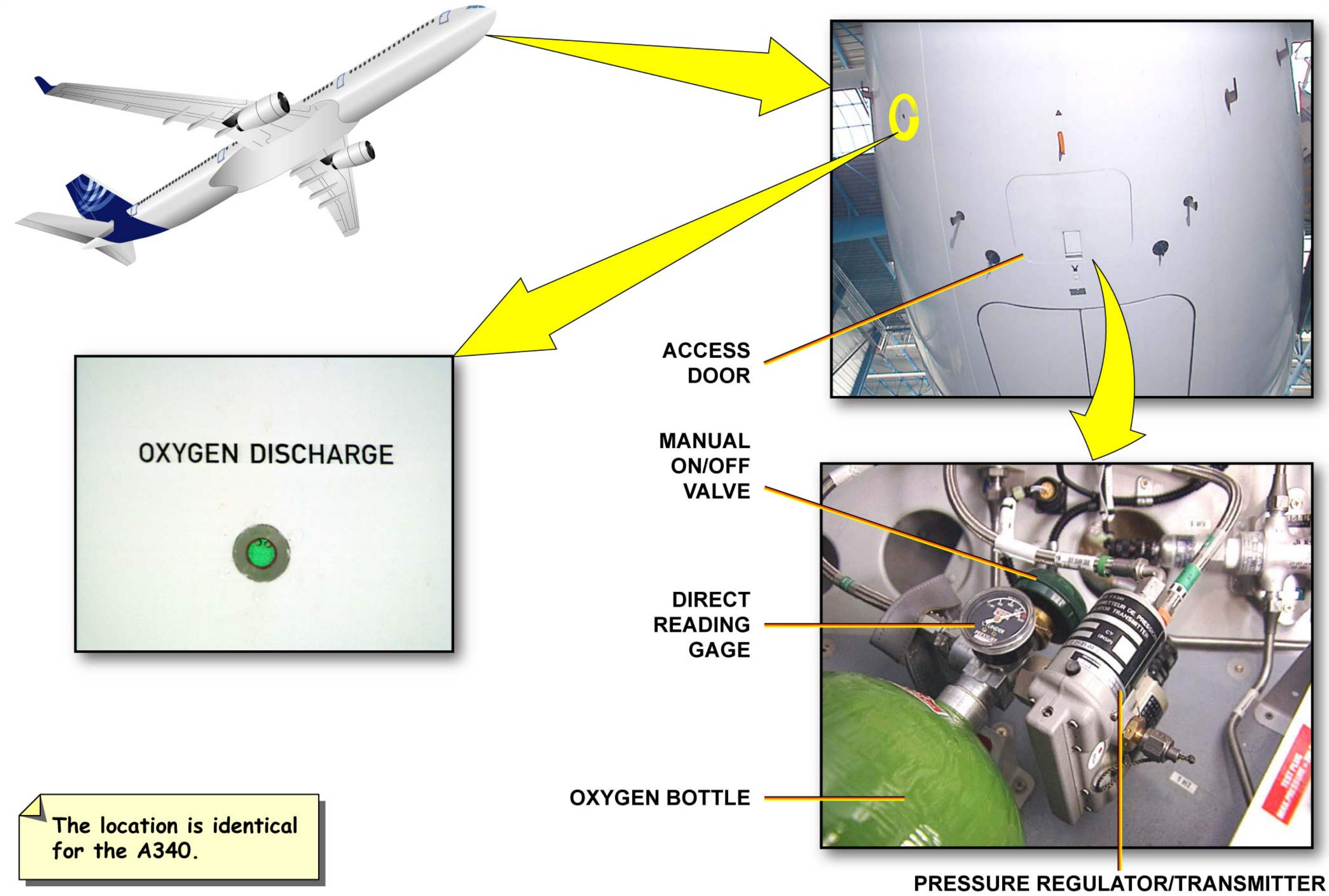
CONTROL AND INDICATING

G6B08031 - G10T4T0 - FM35P4000000001

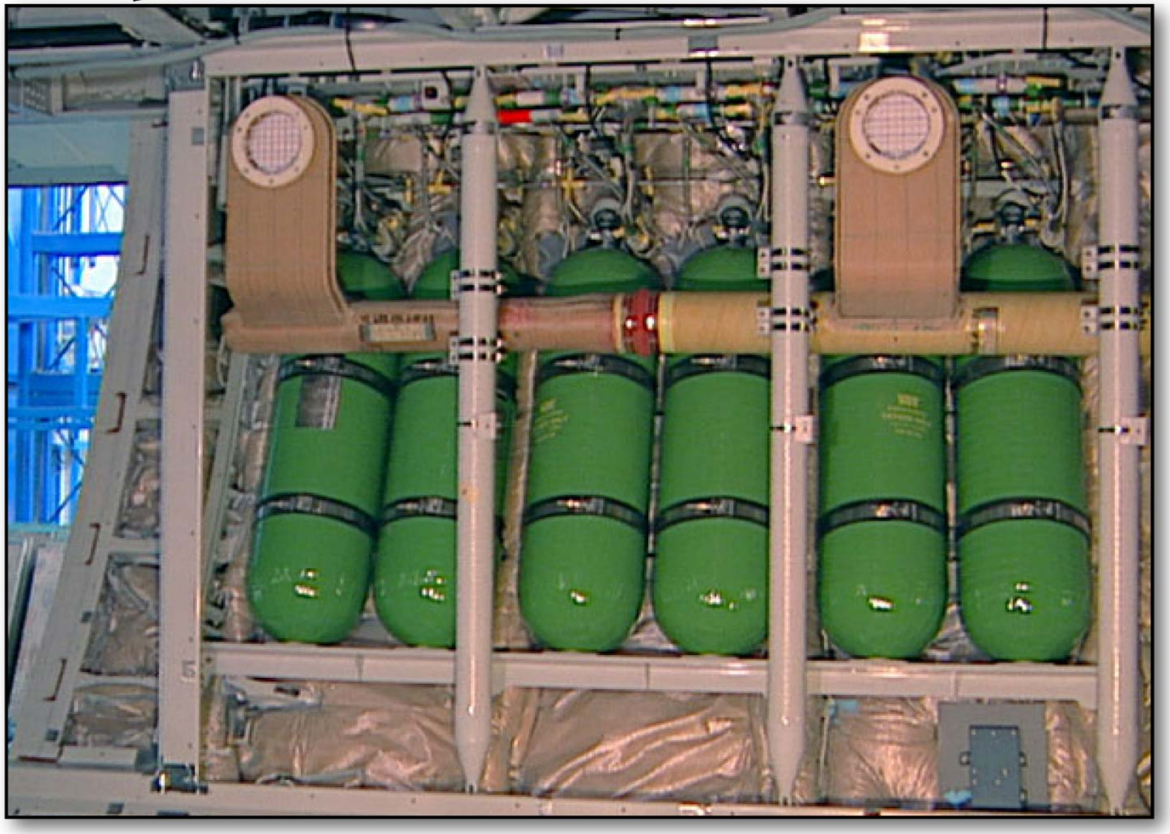
35 OXYGEN SYSTEM PRESENTATION (1)

COMPONENT LOCATION

The cockpit crew oxygen system is located in the FWD area of the avionics compartment.
If installed, the optional gaseous oxygen system is composed of cylinders installed behind the sidewall panels of the FWD cargo compartment, on the RH side.



COMPONENT LOCATION



The location is identical for the A340.

COMPONENT LOCATION

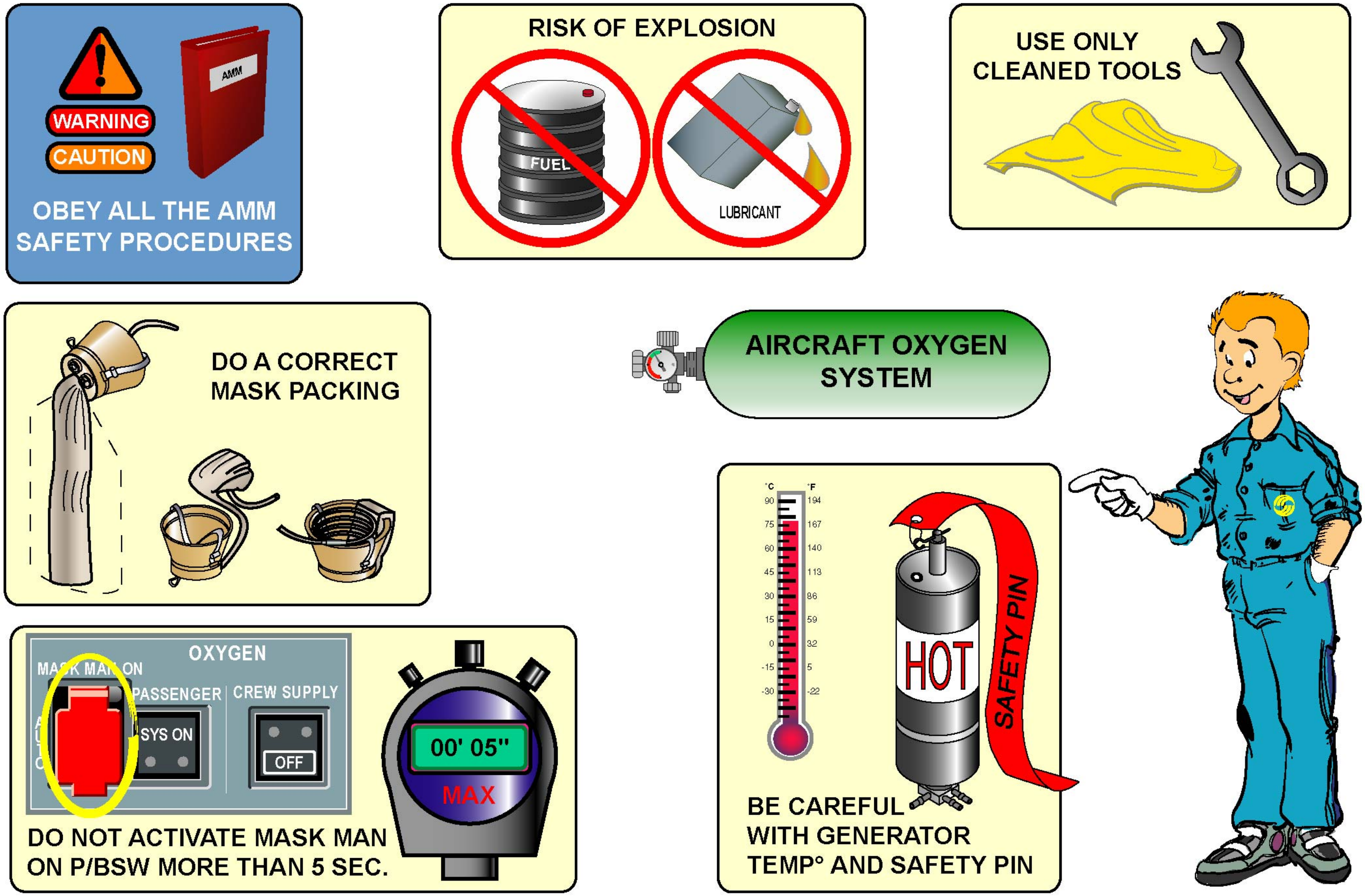
G6B08031 - G10T4T0 - FM35P4000000001

This Page Intentionally Left Blank

35 OXYGEN SYSTEM PRESENTATION (1)

SAFETY PRECAUTIONS

When you work on the oxygen system, you must obey all the AMM safety procedures. This will prevent injury to persons and/or damage to the aircraft. The main safety precautions relative to the oxygen system are:
- keep all hydrocarbons (fuels, lubricants, etc) away from all oxygen sources. Oxygen becomes explosive when in contact with hydrocarbons,
- clean the tools and make sure your hands are clean to prevent contamination of the oxygen system. Be sure that no unwanted particles go into the oxygen system as they can cause damage to the system,
- use gloves if you need to touch the oxygen generator. It stays hot for at least two hours after it stops and can burn you,
- be sure to use or remove generator safety items before removal or installation of a generator. If a component is not safe, the generators can cause damage or will not operate,
- do not hold the MASK MAN ON P/B in for more than 5 seconds. This can cause the relays to become too hot and cause damage,
- make sure that the oxygen masks are packed correctly. If not, it is possible that they will not fall out correctly in an emergency.



SAFETY PRECAUTIONS

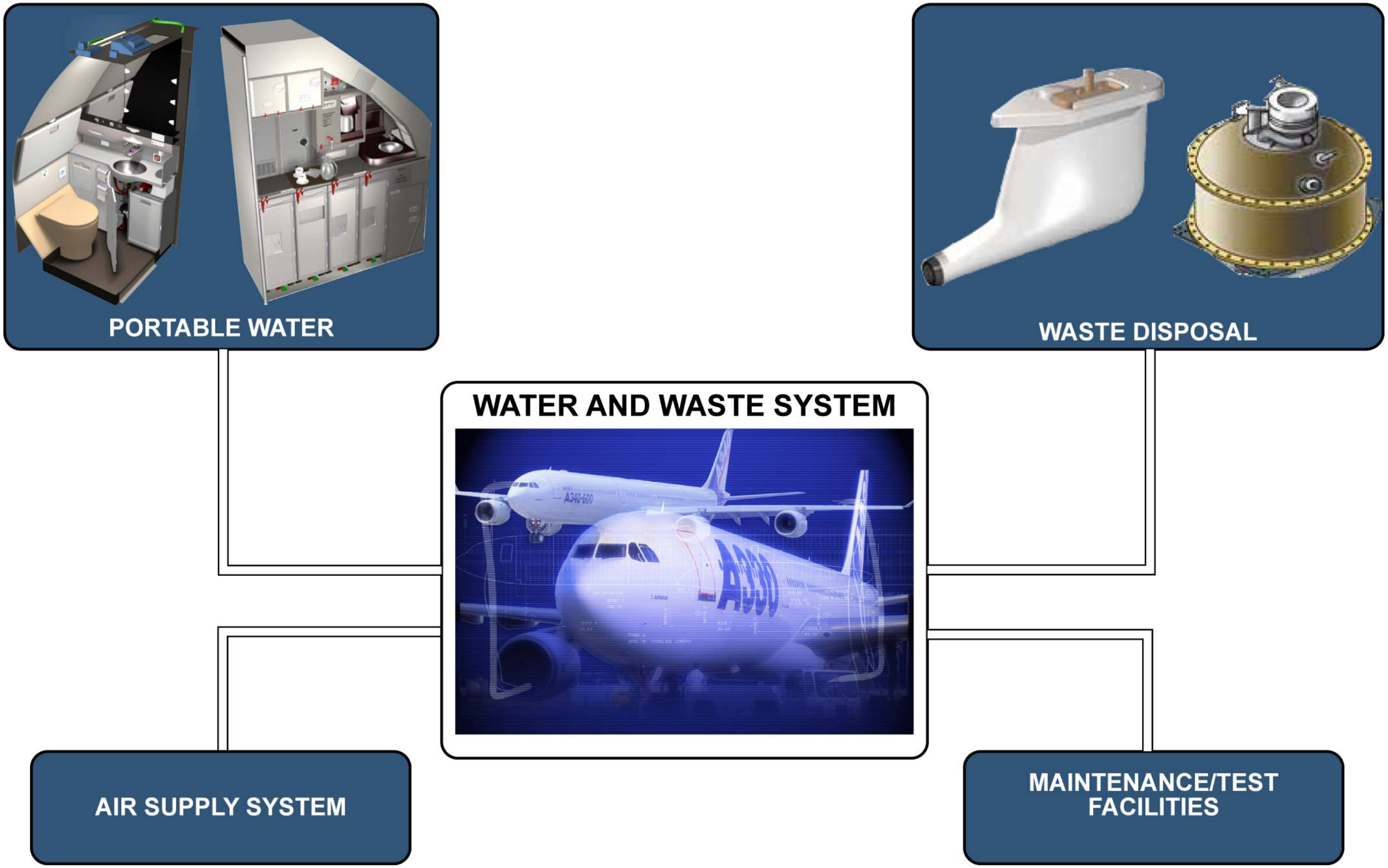
38 WATER AND WASTE SYSTEM PRESENTATION (1)

SYSTEM INTRODUCTION

The water and waste system has:
- the potable water system, which includes the air supply system,
- the waste disposal system.

The water and waste system is linked to the Central Maintenance System (CMS) for maintenance functions.

G6B08031 - G10T4T0 - FM38P4000000001



SYSTEM INTRODUCTION

38 WATER AND WASTE SYSTEM PRESENTATION (1)

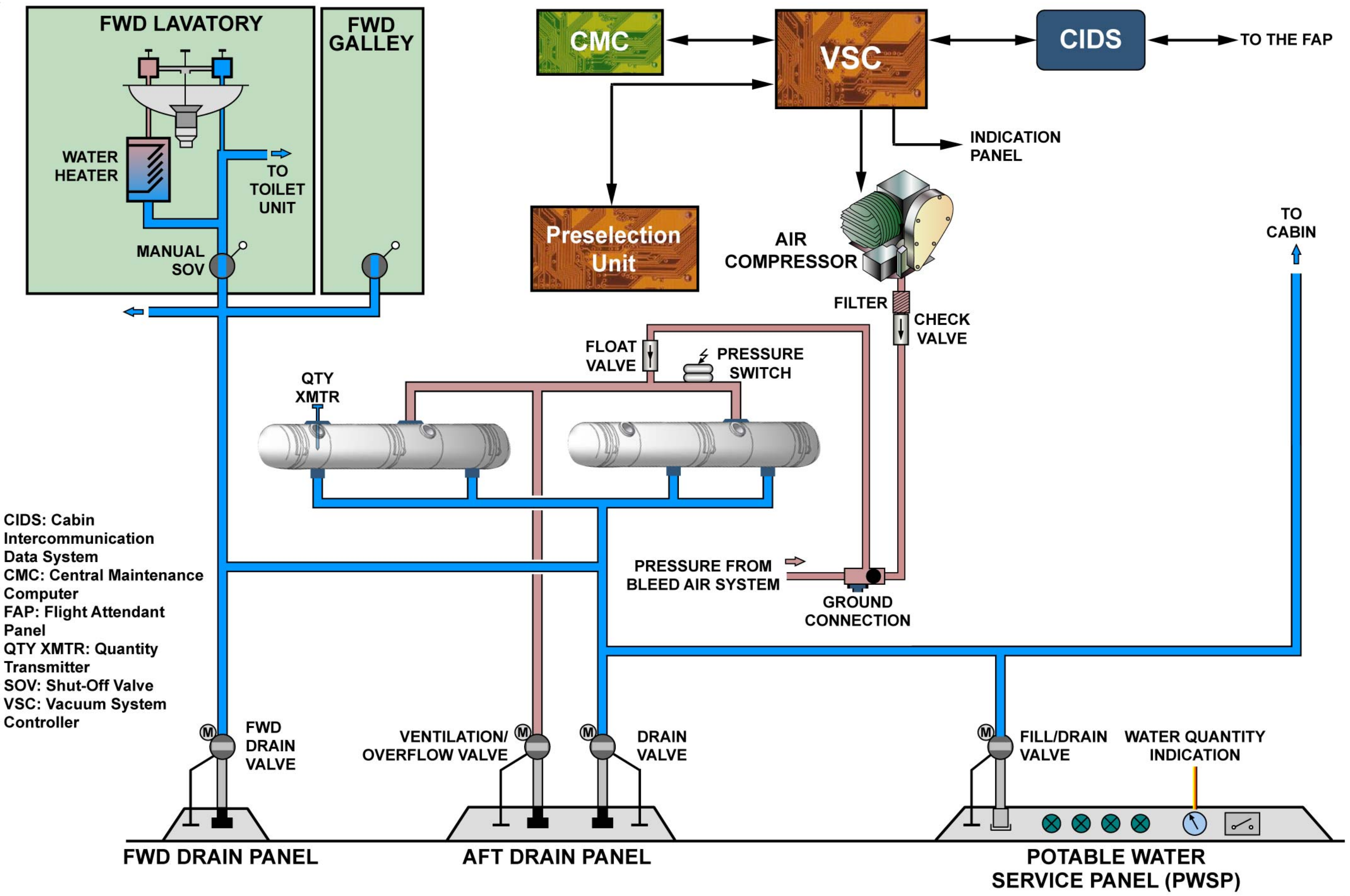
POTABLE WATER SYSTEM

GENERAL

Potable water is stored in water tanks. The water system supplies galleys and lavatories. To fulfill sufficient supply of potable water in all cabin locations, the system is air pressurized. The Vacuum System Controller (VSC) manages the potable water system. The VSC interfaces with one pre-selection unit for filling control and also with the transmitter, which monitor the quantity of potable water in the tanks and send the data to the VSC. The VSC then sends this data to:
- the Cabin Intercommunication Data System (CIDS) and the quantity indicator at the Potable Water Service Panel (in option),
- and sends a signal to the Central Maintenance Computer (CMC) if the system does not operate correctly.

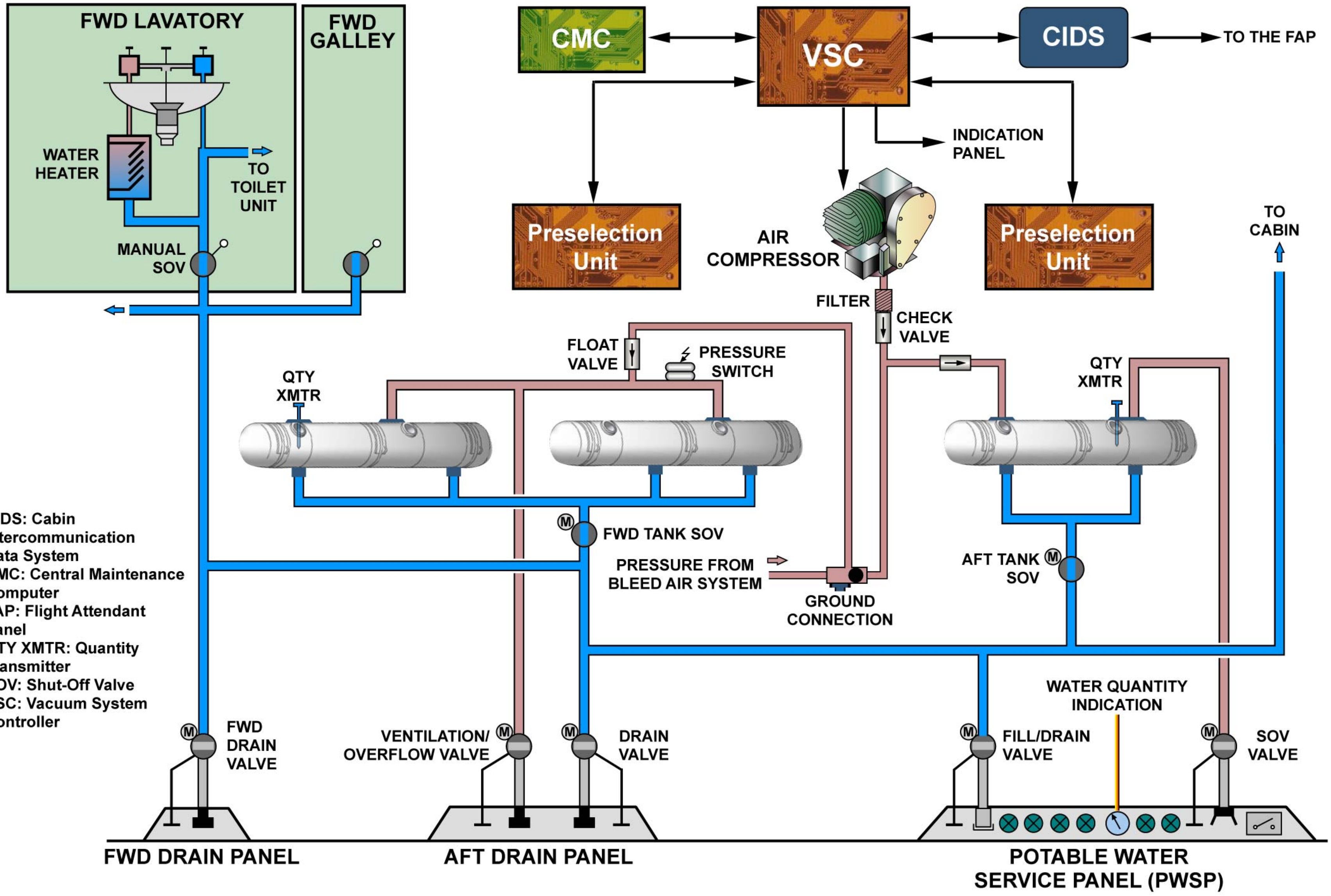
The water quantity in the tanks is indicated on the Flight Attendant Panel (FAP) and on the Potable Water Service Panel (PWSP). Potable water is distributed to the lavatories and the galleys from any tank. In the lavatories, a part of the water supplied to the faucets is heated in water heaters. The potable water system can be serviced with or without electrical power. With electrical power available all the servicing (filling and draining) will be done from the PWSP and the aft drain panel, using the control handles. For filling and draining without electrical power, the related valves have to be manually operated.

A third water tank can be installed in the bulk cargo compartment. With three potable water tanks, the VSC interfaces with the two pre-selection units for filling control and also with two transmitters, which monitor the quantity of potable water in the tanks and send the data to the VSC.



POTABLE WATER SYSTEM - GENERAL

G6B08031 - G10T4T0 - FM38P4000000001



CIDS: Cabin Intercommunication Data System
CMC: Central Maintenance Computer
FAP: Flight Attendant Panel
QTY XMTR: Quantity Transmitter
SOV: Shut-Off Valve
VSC: Vacuum System Controller

POTABLE WATER SYSTEM - GENERAL

G6B08031 - G10T4T0 - FM38P4000000001

This Page Intentionally Left Blank

38 WATER AND WASTE SYSTEM PRESENTATION (1)

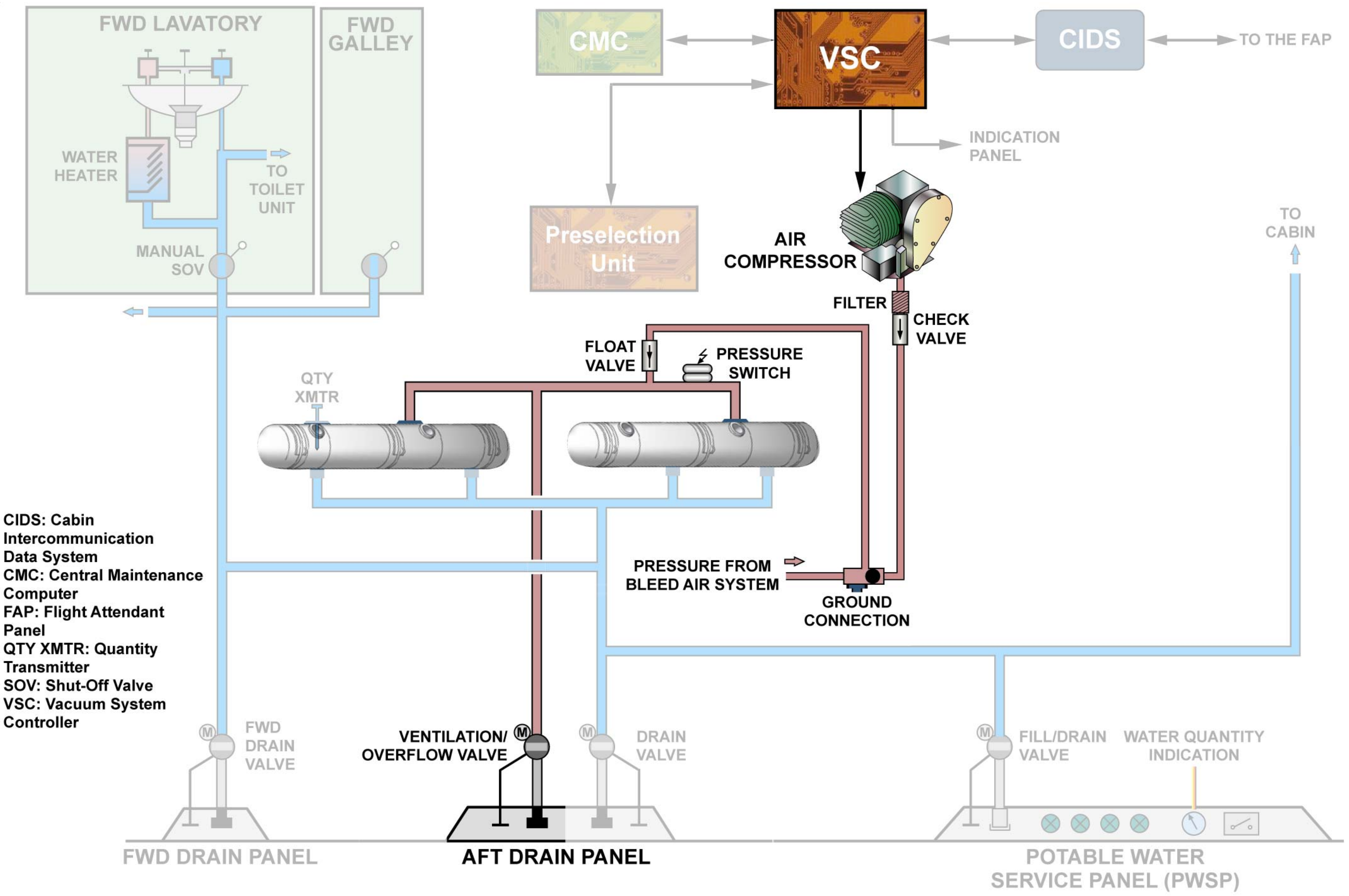
POTABLE WATER SYSTEM (continued)

AIR SUPPLY SYSTEM

The potable water system is supplied with pressurized air as follows:
- normal supply from the bleed system (Engines or APU),
- an electrical compressor will pressurize the potable water system, mainly on ground when the engines or the APU are not available,
- if none of the above is available, a ground connection can be used by the maintenance staff.

NOTE: During the servicing, the potable water system will be automatically depressurized.

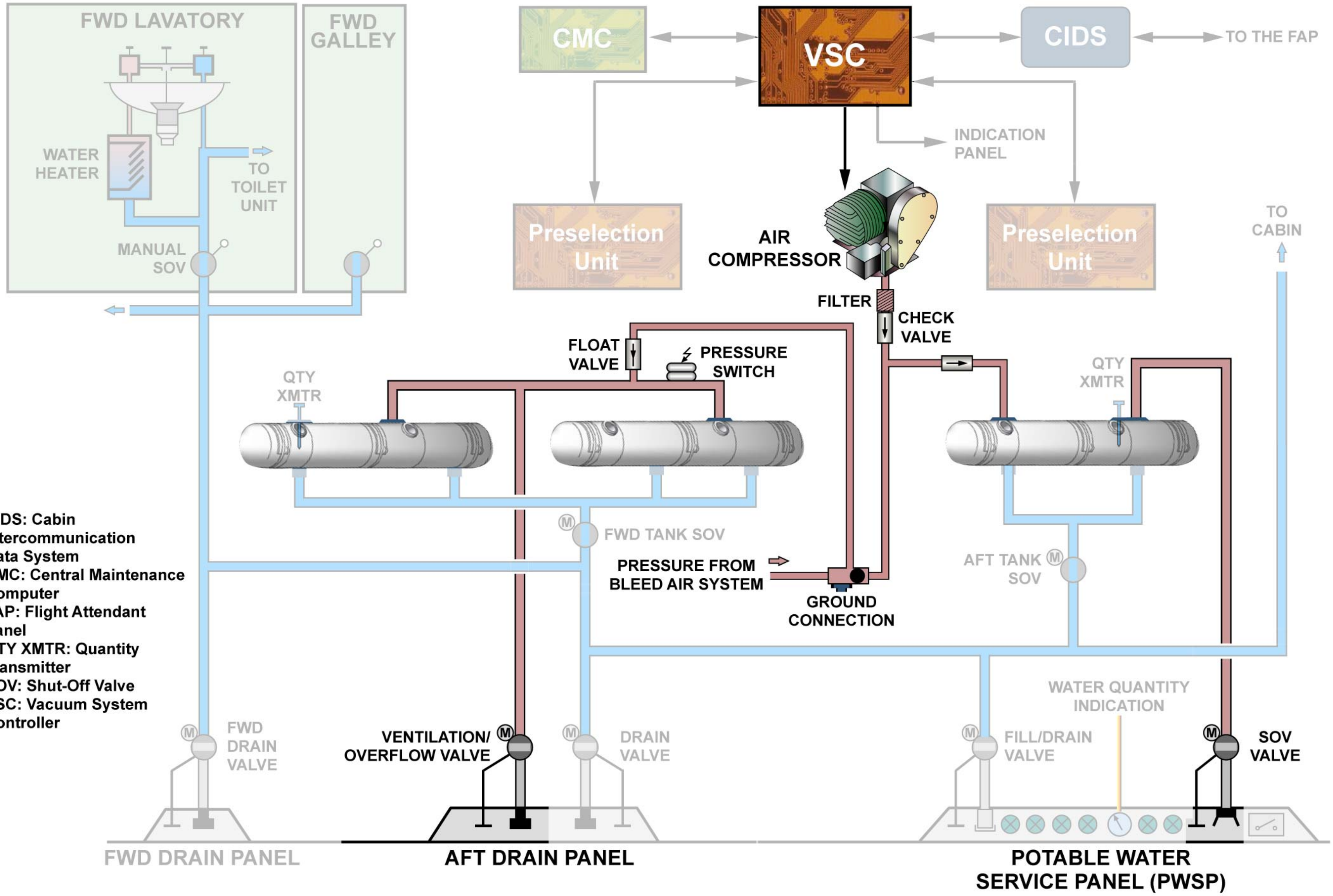
The air supply system is identical with three water tanks installed.



CIDS: Cabin Intercommunication Data System
CMC: Central Maintenance Computer
FAP: Flight Attendant Panel
QTY XMTR: Quantity Transmitter
SOV: Shut-Off Valve
VSC: Vacuum System Controller

POTABLE WATER SYSTEM - AIR SUPPLY SYSTEM

G6B08031 - G10T4T0 - FM38P4000000001



CIDS: Cabin Intercommunication Data System
CMC: Central Maintenance Computer
FAP: Flight Attendant Panel
QTY XMTR: Quantity Transmitter
SOV: Shut-Off Valve
VSC: Vacuum System Controller

POTABLE WATER SYSTEM - AIR SUPPLY SYSTEM

G6B08031 - G10T4T0 - FM38P4000000001

This Page Intentionally Left Blank

38 WATER AND WASTE SYSTEM PRESENTATION (1)

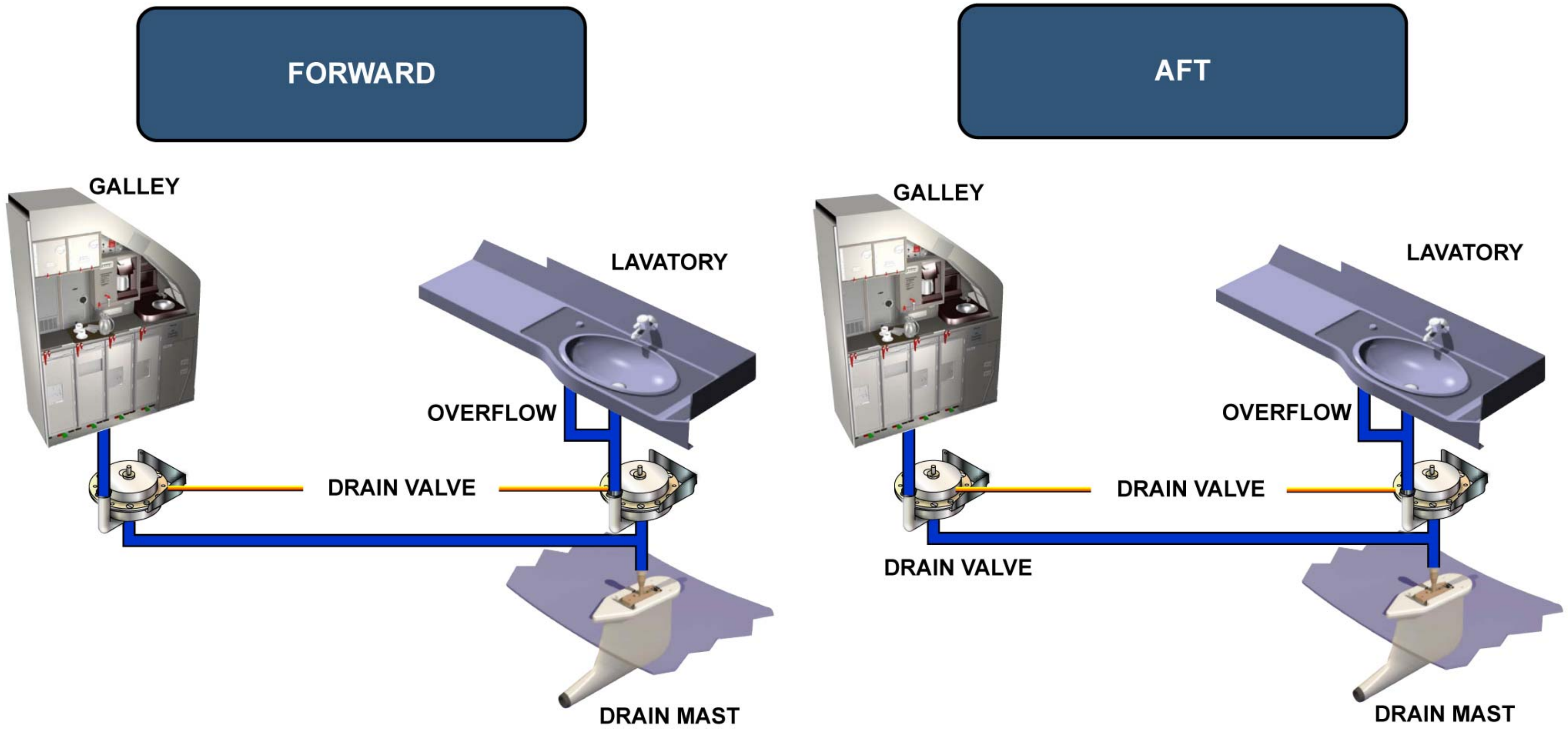
WASTE WATER SYSTEM

DRAIN VALVE

Waste water disposal from the galleys and toilets washbasins is achieved by gravity and by differential pressure. The drain valves are installed to prevent leakage of cabin air pressure through the drain lines.

DRAIN MASTS

The waste water is discharged overboard through two drain masts. To prevent ice formation, the drain masts are electrically heated.



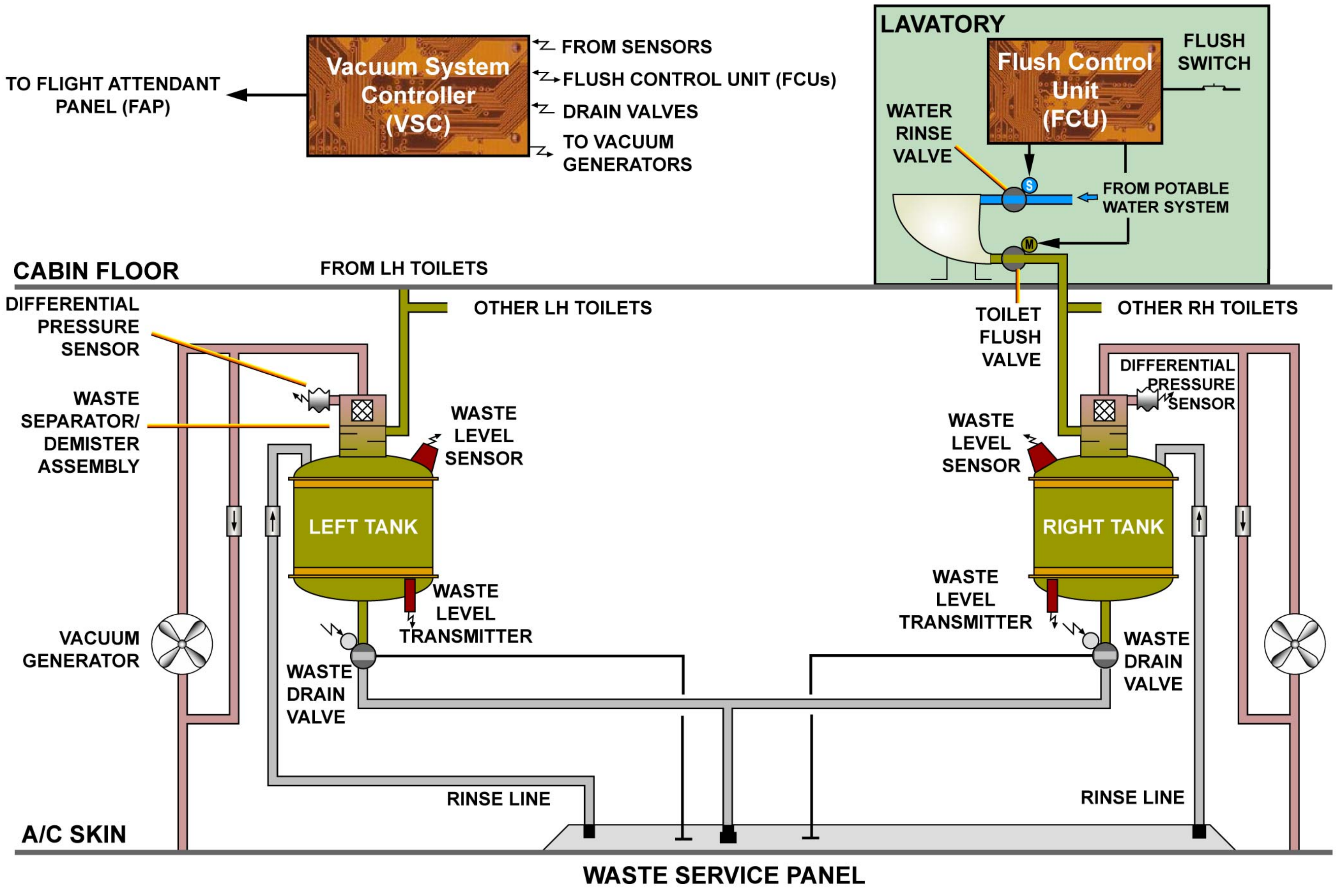
WASTE WATER SYSTEM - DRAIN VALVE & DRAIN MASTS

38 WATER AND WASTE SYSTEM PRESENTATION (1)

VACUUM TOILET SYSTEM

The toilet waste system is divided into two independent parts (LH and RH sides). Two waste tanks are installed. When a toilet is flushed, waste from the toilet assembly is sent to the waste tanks under the effect of differential pressure. When this differential pressure is not sufficient, a vacuum generator operates the necessary vacuum. The waste tanks are drained from the waste service panel. The VSC controls and monitors the toilet system. The waste level is indicated on the FAP. A Flush Control Unit (FCU) sequences each toilet operation. To help flushing the toilet bowls, water from the potable water system is supplied during operation. The toilet system is drained, flushed and cleaned with disinfectant from the waste service panel.

NOTE: Note: Those parts of the drain and flush lines as well as valves and connections are heated.



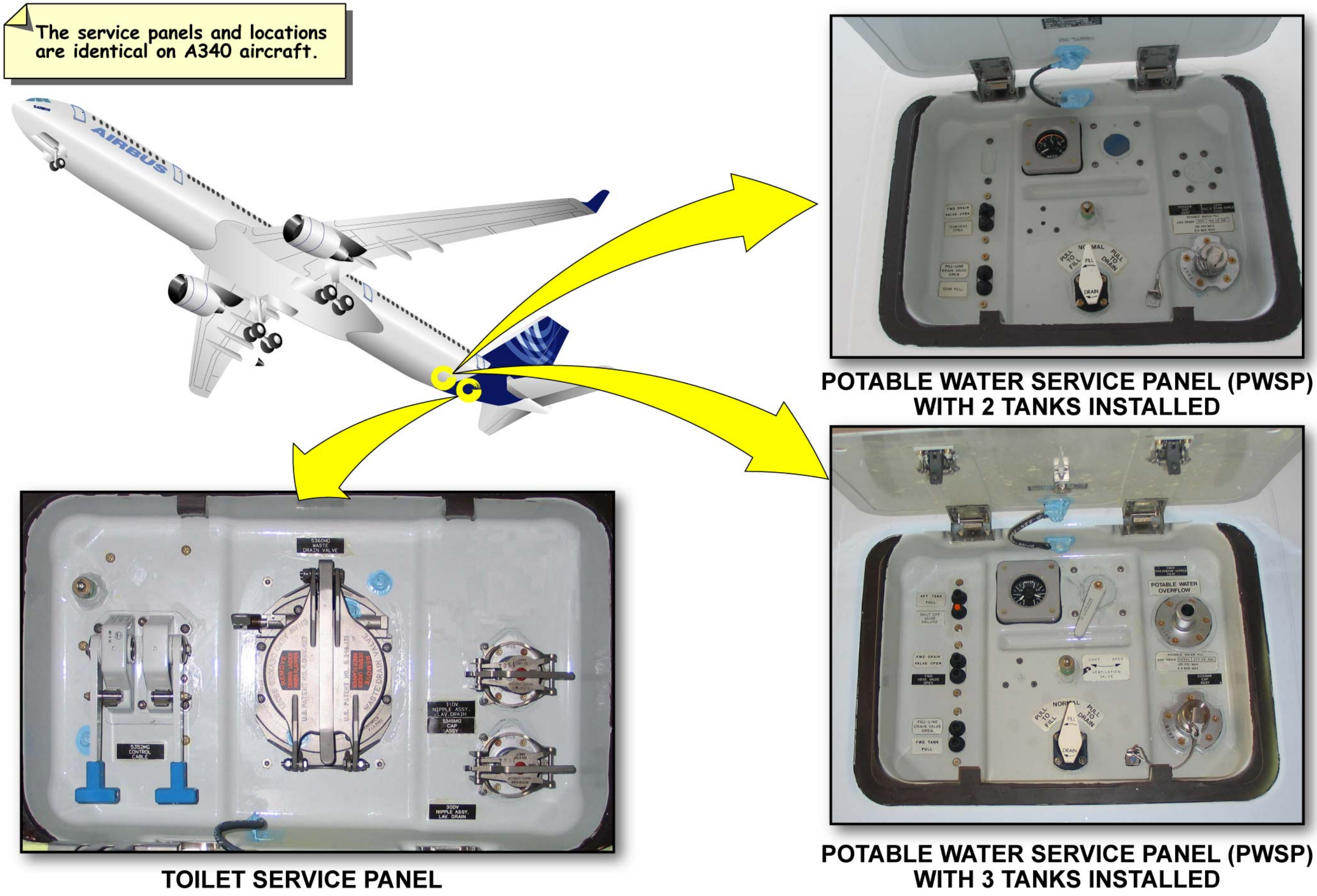
VACUUM TOILET SYSTEM

G6B08031 - G10T4T0 - FM38P4000000001

38 WATER AND WASTE SYSTEM PRESENTATION (1)

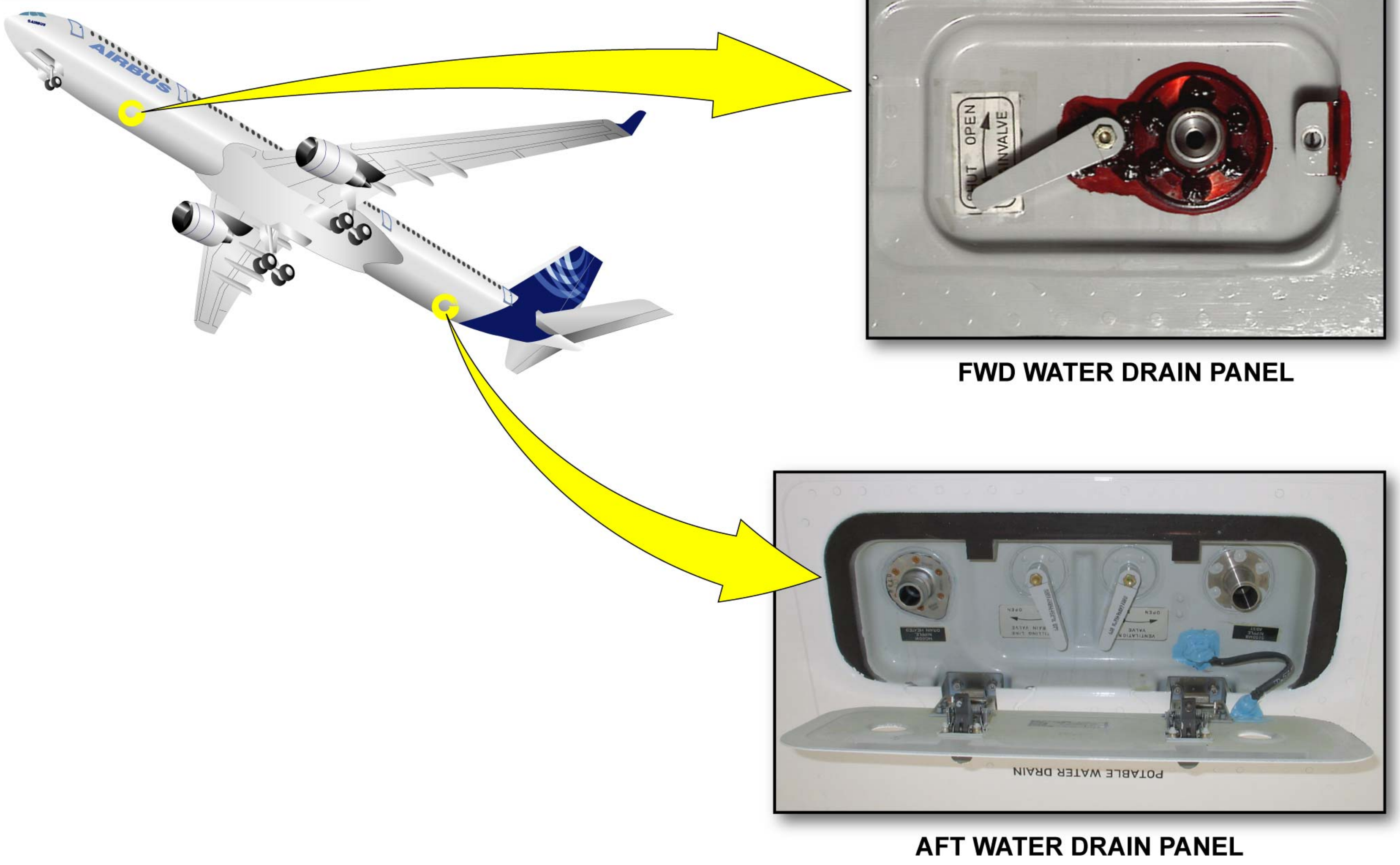
SERVICE PANELS LOCATION

The Potable Water Service Panel (PWSP) is installed on the rear side of the fuselage. It is used to fill or drain the potable water system. If the third water tank is installed, the PWSP is different.
The toilet service panel is located at the bottom centerline of the aircraft. It is used to drain the waste holding tanks and to flush the reservoirs.
The aft water drain panel is installed in the aft lower fuselage. It is used to fill and drain. The FWD water drain panel is installed on the FWD left side lower fuselage. It is used to drain the FWD section.



SERVICE PANELS LOCATION

The service panels and locations are identical on A340 aircraft.



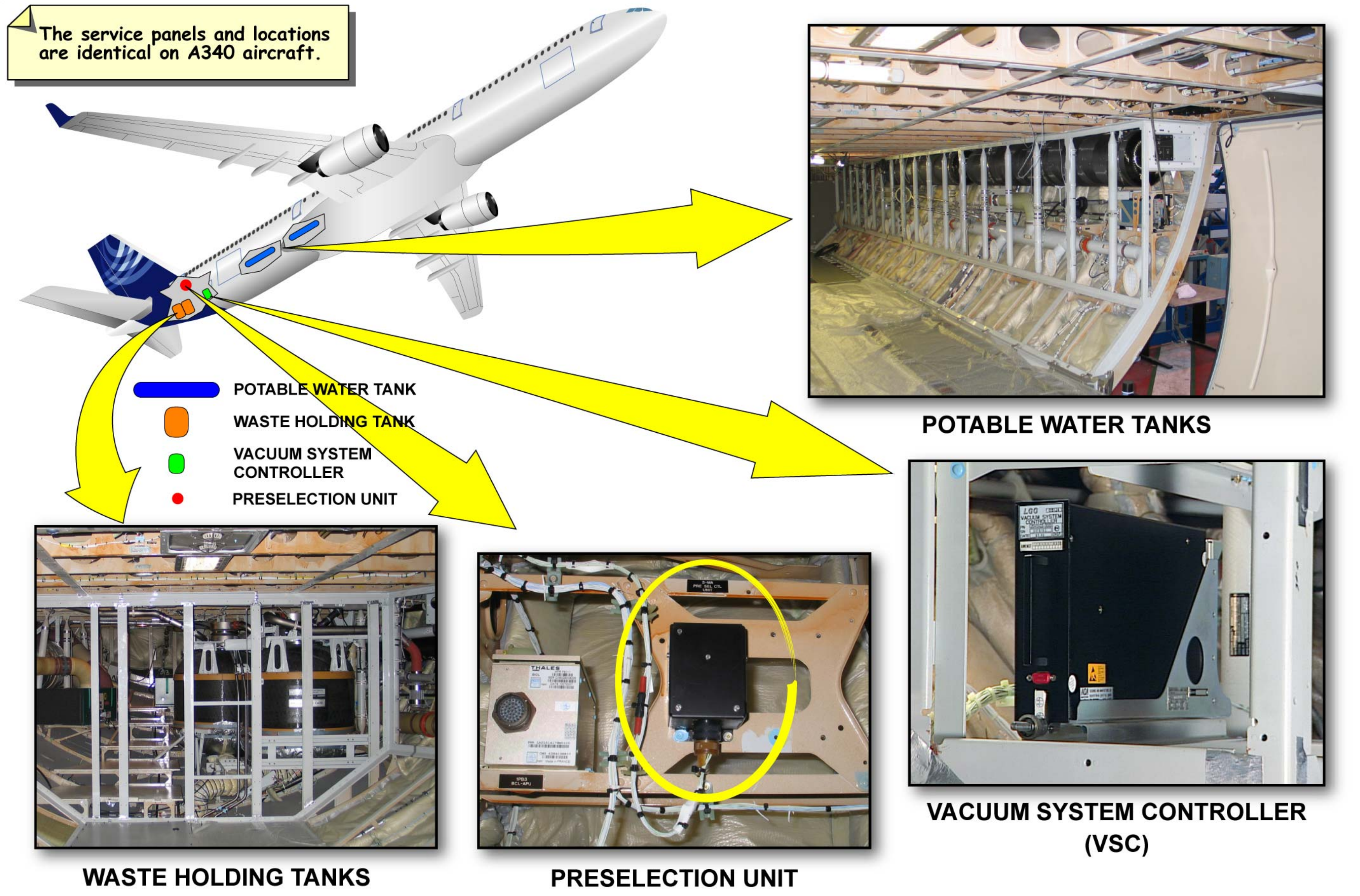
SERVICE PANELS LOCATION

This Page Intentionally Left Blank

38 WATER AND WASTE SYSTEM PRESENTATION (1)

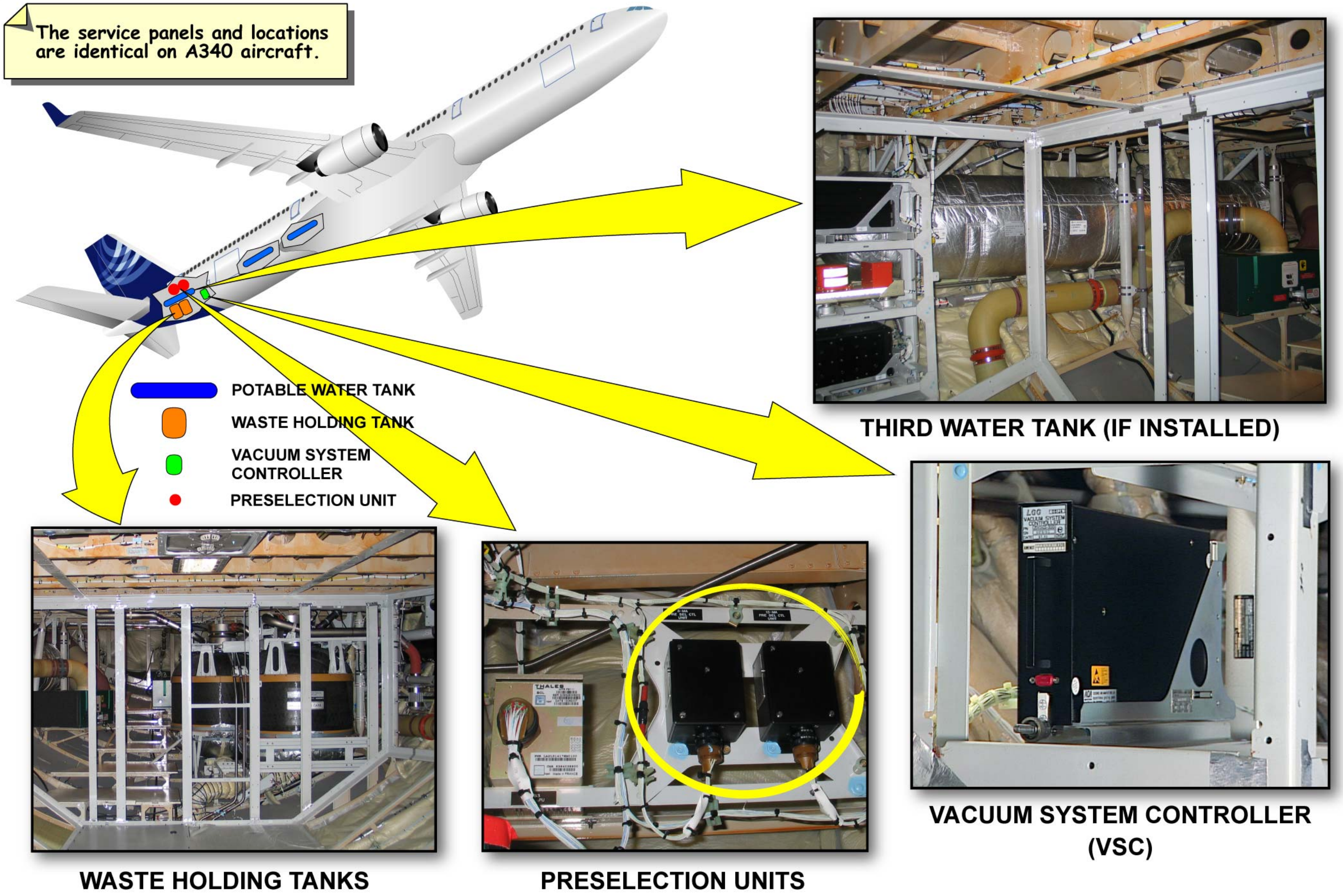
COMPONENT LOCATION

The waste holding tanks are installed in the aft fuselage on the LH side. The VSC is installed in the bulk cargo compartment on the RH side. The potable water tanks are installed in the aft cargo compartment and RH aft fuselage. The pre-selection unit is installed above the bulk cargo door. If there are three potable water tanks installed, the third water tank is located in the bulk cargo compartment and two pre-selection units are installed.



COMPONENT LOCATION

G6B08031 - G10T4T0 - FM38P4000000001



COMPONENT LOCATION

This Page Intentionally Left Blank

38 WATER AND WASTE SYSTEM PRESENTATION (1)

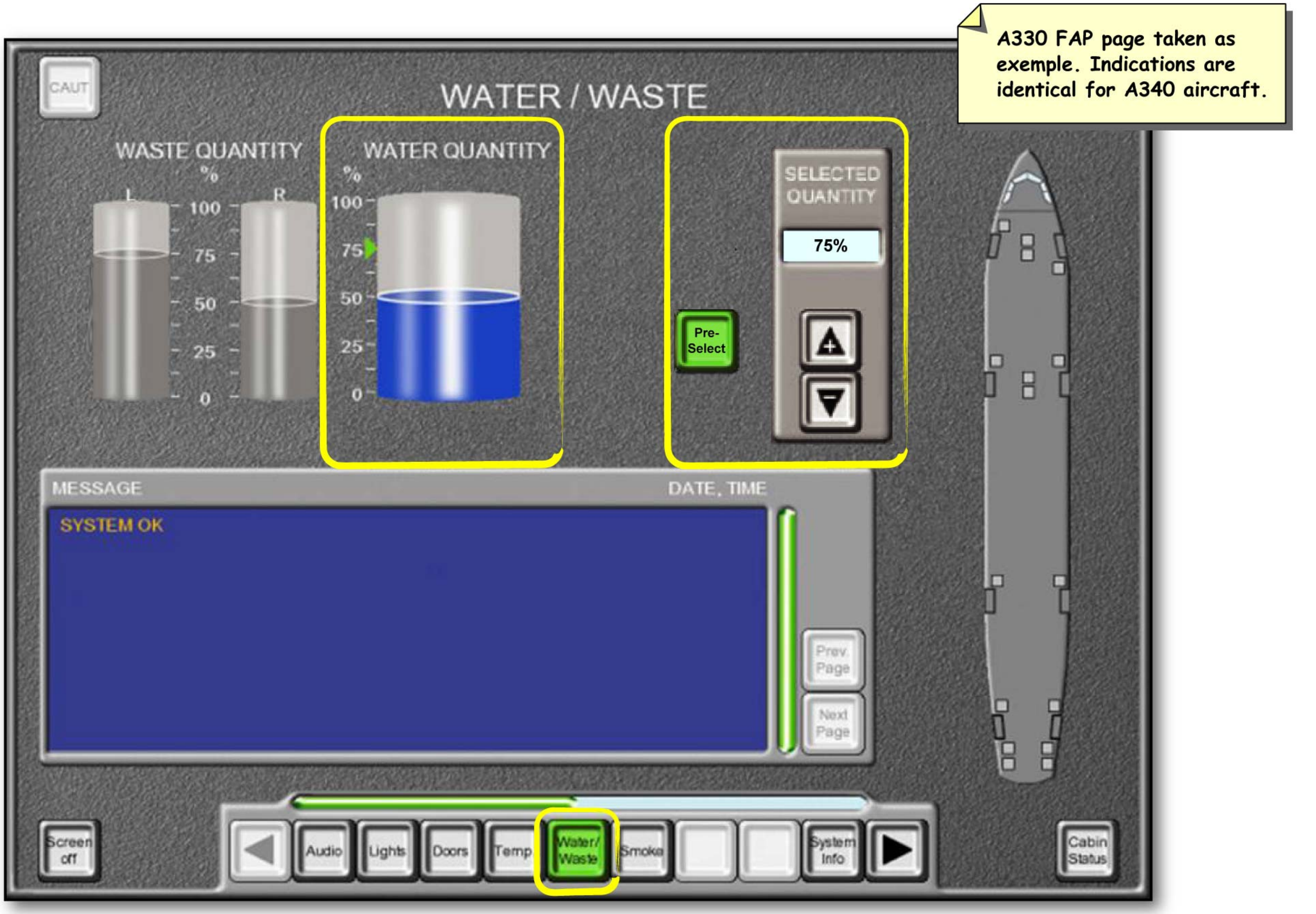
CONTROL AND INDICATING

POTABLE WATER

The quantity indicating system has a quantity transmitter installed in the forward tank. A second quantity transmitter if fitted on the third tank if installed.

NOTE: Note that the second tank does not have any transmitter as it is connected to the forward tank.

On the FAP, when the Water/Waste P/B is pressed, the WATER/WASTE page appears and displays the water quantity. The water quantity pre-selection is available by selecting the WATER/WASTE page before opening the water service panel door. The memorized water quantity can be changed then by selecting the Pre-Select prompts. Status and fault messages of the water and waste systems are displayed in a dedicated window.



CONTROL AND INDICATING - POTABLE WATER

38 WATER AND WASTE SYSTEM PRESENTATION (1)

CONTROL AND INDICATING (continued)

VACUUM TOILETS

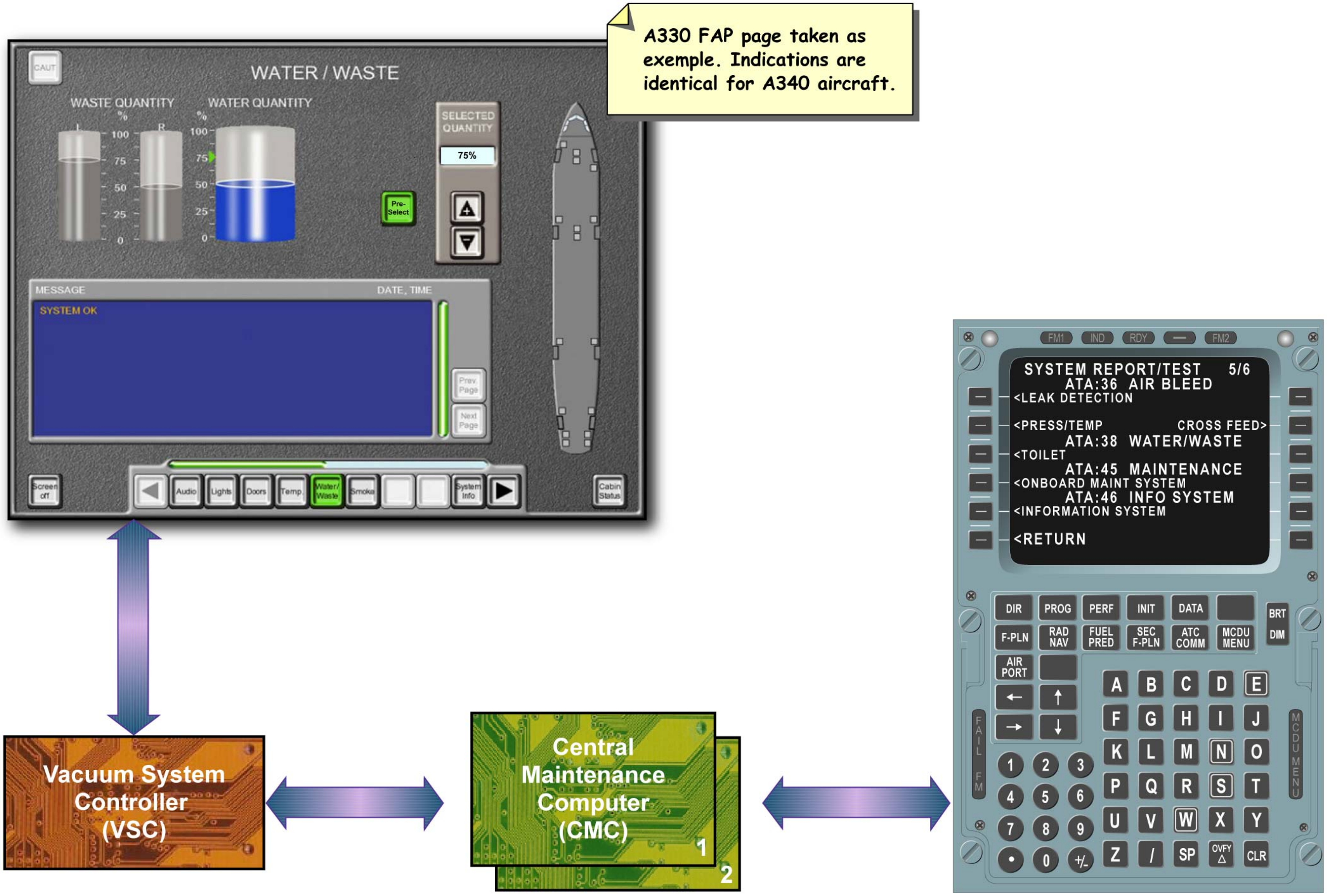
A waste quantity transmitter installed at the bottom of each tank gives information through the VSC for the FAP WATER/WASTE page quantity indication. A tank full sensor confirms the quantity transmitter " TANK FULL " signal. On the FAP, when the Water/Waste P/B is pressed, the WATER/WASTE page is displayed. The waste quantity of the LH and RH waste holding tanks are shown on the FAP. Status and fault messages of the water and waste systems are displayed on a dedicated window.

CONTROL AND INDICATING - VACUUM TOILETS

38 WATER AND WASTE SYSTEM PRESENTATION (1)

MAINTENANCE/TEST FACILITIES

The VSC sends data faults from the toilet and the potable water systems to the CMCs. Any system condition that requires special crew actions or information messages will be displayed on the FAP.



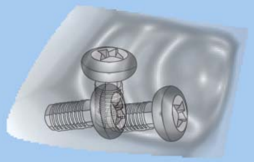
MAINTENANCE/TEST FACILITIES

G6B08031 - G10T4T0 - FM38P4000000001

38 WATER AND WASTE SYSTEM PRESENTATION (1)

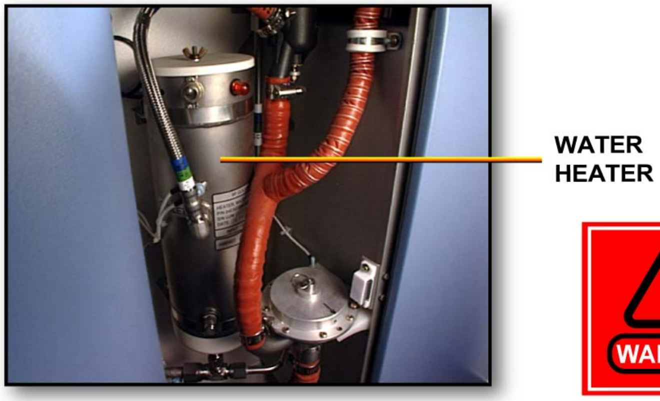
SAFETY PRECAUTIONS

When you work on the aircraft, make sure that you obey all the AMM safety procedures. This will prevent injury to persons and/or damage to the aircraft. Here is an overview of main safety precautions relative to the water and waste system. Before you start a task make sure that the warning notices are in position. When you complete the work procedure, clean your hands with soap and water. This will prevent infection (toilet waste is dangerous for health. Do not work on the waste system and the portable water system at the same time. This will prevent contamination of the potable water system. When you remove a component of the toilet waste system, always put it in a plastic bag, then seal the bag. Do not put documents into the plastic bag. Seal the bag first, then attach the document to it. When you work on the potable water system make sure that the equipment you use for the procedure is clean and approved for this system. If not it can cause contamination. Do not touch the water heater until it is sufficiently cool to prevent burns when you do the maintenance tasks.



THE COMPONENTS OF THE TOILET WASTE SYSTEM MUST BE PUT IN A SEALED PLASTIC BAG TO AVOID CONTAMINATION.

DO NOT WORK ON THE TOILET WASTE SYSTEM AND THE POTABLE WATER SYSTEM AT THE SAME TIME.



SAFETY PRECAUTIONS

38 WATER AND WASTE SYSTEM PRESENTATION (1)

ENVIRONMENTAL PRECAUTIONS

Do not discharge products such as oil, fuel, solvent, lubricant either in trash bins, soil or into the water network (drains, gutters, rain water, waste water, etc...). Sort waste fluids and use specific waste disposal containers. Each product must be stored in an appropriate and specific cabinet or room such as a fire-resistant and sealed cupboard.

STORE PRODUCTS IN APPROPRIATE CONTAINER/CUPBOARD/ROOM

SORT WASTE FLUIDS IN CONTAINERS

AVOID FLUID SPILLAGE
USE APPROPRIATE STORAGE EQUIPMENT FOR CHEMICAL PRODUCTS

FLUID SPILL CLEANUP KIT

USE SPECIFIC WASTE DISPOSAL CONTAINERS

ENVIRONMENTAL PRECAUTIONS

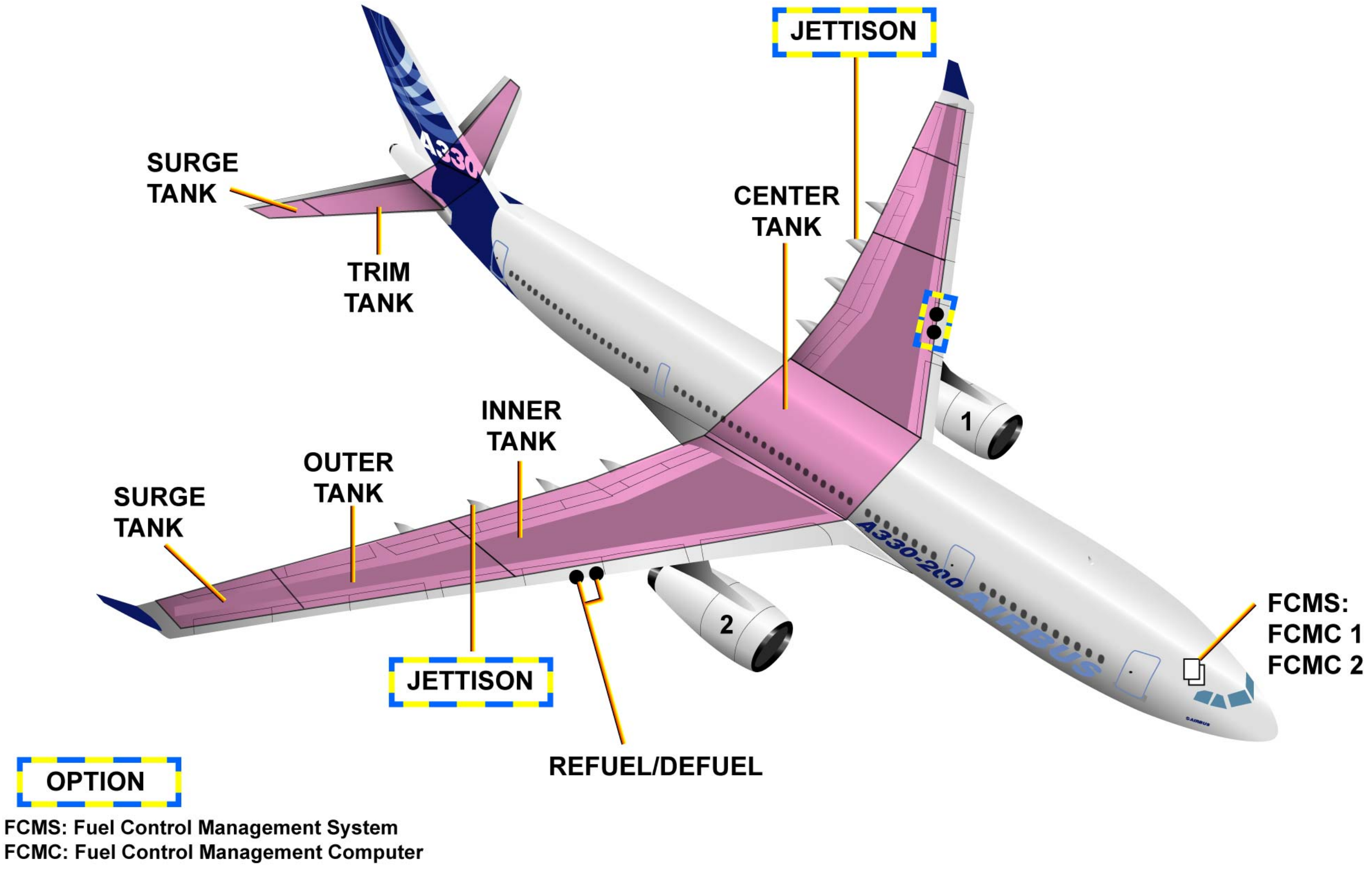
G6B08031 - G10T4T0 - FM38P4000000001

28 FUEL SYSTEM PRESENTATION (A330-200) (1)

GENERAL

The fuel system has different functions, which are:
- storage, venting and scavenge,
- engine feed,
- APU feed,
- main and trim transfers,
- refuel/defuel,
- jettison as an option,
- and the maintenance/test facilities.

When you work on A/C, you must obey all the safety procedures listed in the AMM.



G6B08031 - G10T4T0 - FM28P8000000003

GENERAL

28 FUEL SYSTEM PRESENTATION (A330-200) (1)

STORAGE

The fuel is stored in six tanks. In each wing, there are an outer and an inner tanks divided into two parts: the forward inner tank, and the aft inner tank. There also are a center tank, and a trim tank. Each inner tank section has one closed area called the collector cell, which is a reservoir for the booster pumps. A dedicated jet pump is only used to fill the collector cell of the main booster pumps. A vent surge tank is installed outboard of each outer tank in the wing and on the RH side of the trim tank. They vent the fuel tanks and collect fuel split from the tanks. Each tank has one or more water drain valves located at low points.

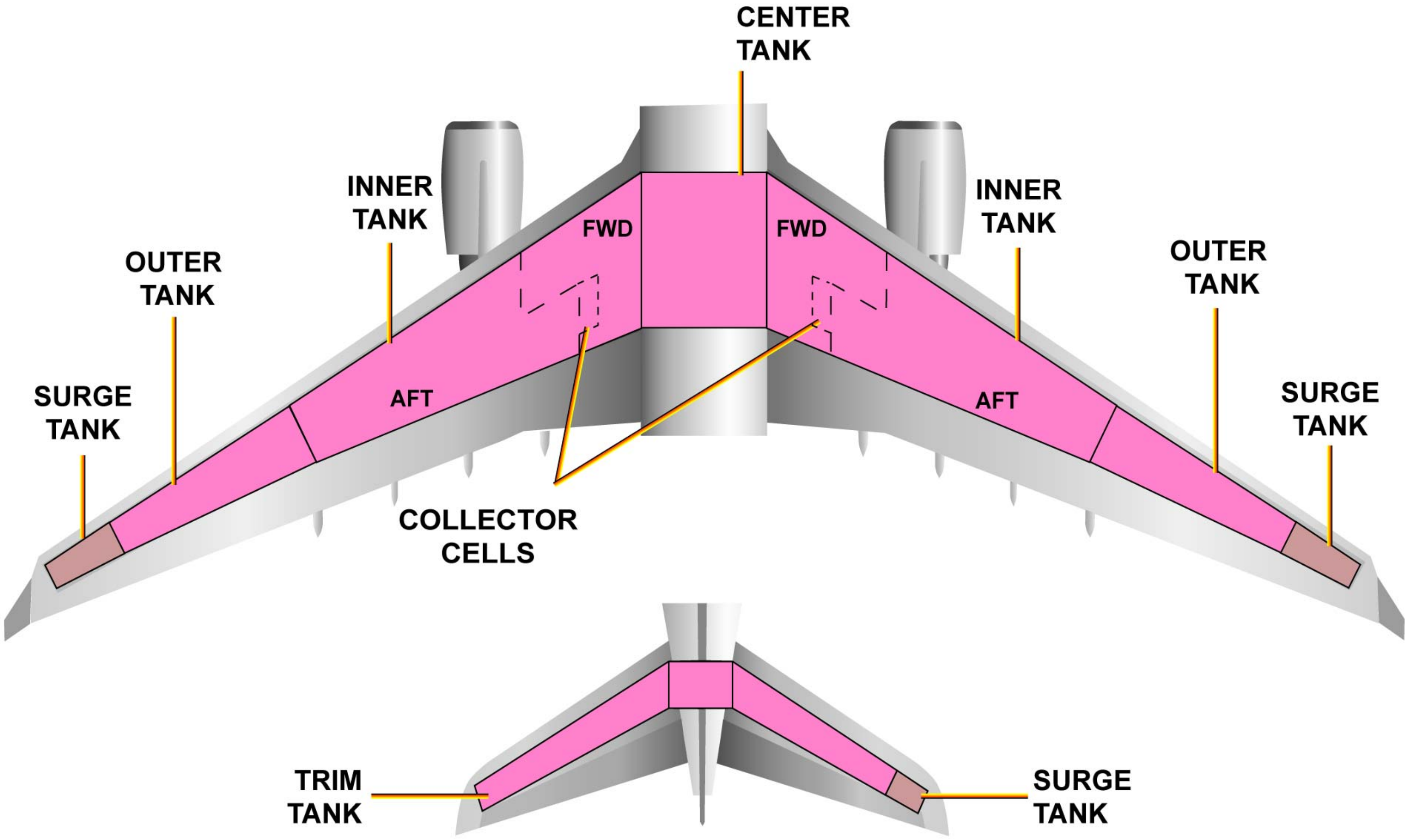
Two Fuel Control and Monitoring Computers (FCMCs) receive inputs from the different probes and sensors installed in the fuel tanks. The FCMCs transmit data to the ECAM and to the Refuel/Defuel panel. Each FCMC does the data monitoring and the calculation simultaneously, however one computer at a time achieves the control function (FCMC1 in normal condition).

Two high level sensors are installed in each tank. When high level is sensed, the FCMC closes the related tank inlet valve. Low Level sensors are installed in each tank except in the outer tanks. They are used to control fuel operations and to trigger low-level warnings. One overflow sensor is installed in each surge tank. If an overflow is sensed, the FCMC closes all inlet valves and the refuel isolation valve.

In each fuel tank, the fuel quantities are measured from Fuel Quantity Indication (FQI) probes, compensators and densitometers. Temperature sensors are installed in each tank for fuel temperature monitoring and ECAM display.

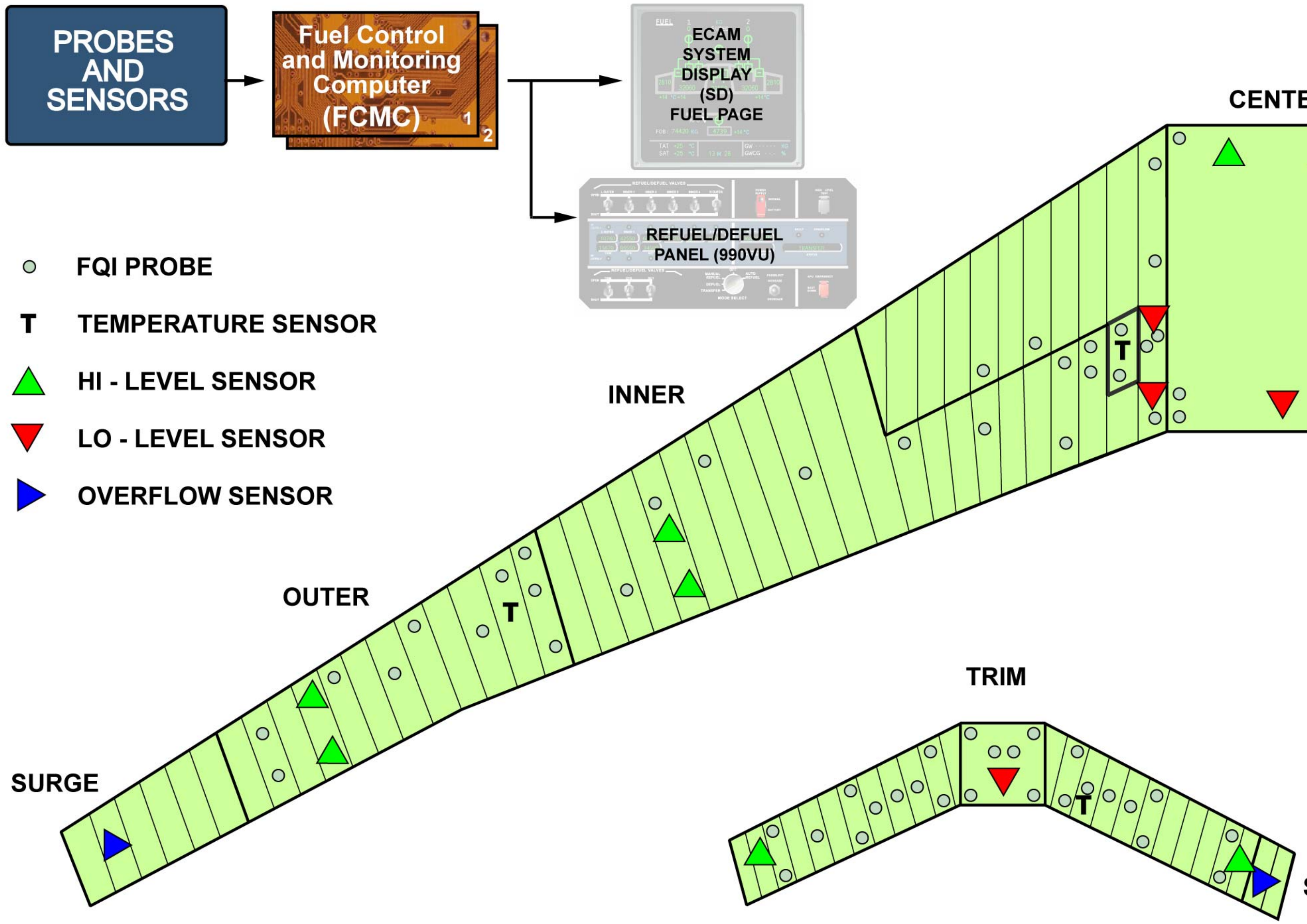
FUEL TANK	L/R OUTER	L/R INNER	CENTER	TRIM	TOTAL
WEIGHT (Kg)*	2865	32970	32625	4891	109186
WEIGHT (Lb)*	6317	72686	71925	10782	240713

* FUEL SPECIFIC GRAVITY: 0.785 KG/L OR 6.551 LBS/US GAL

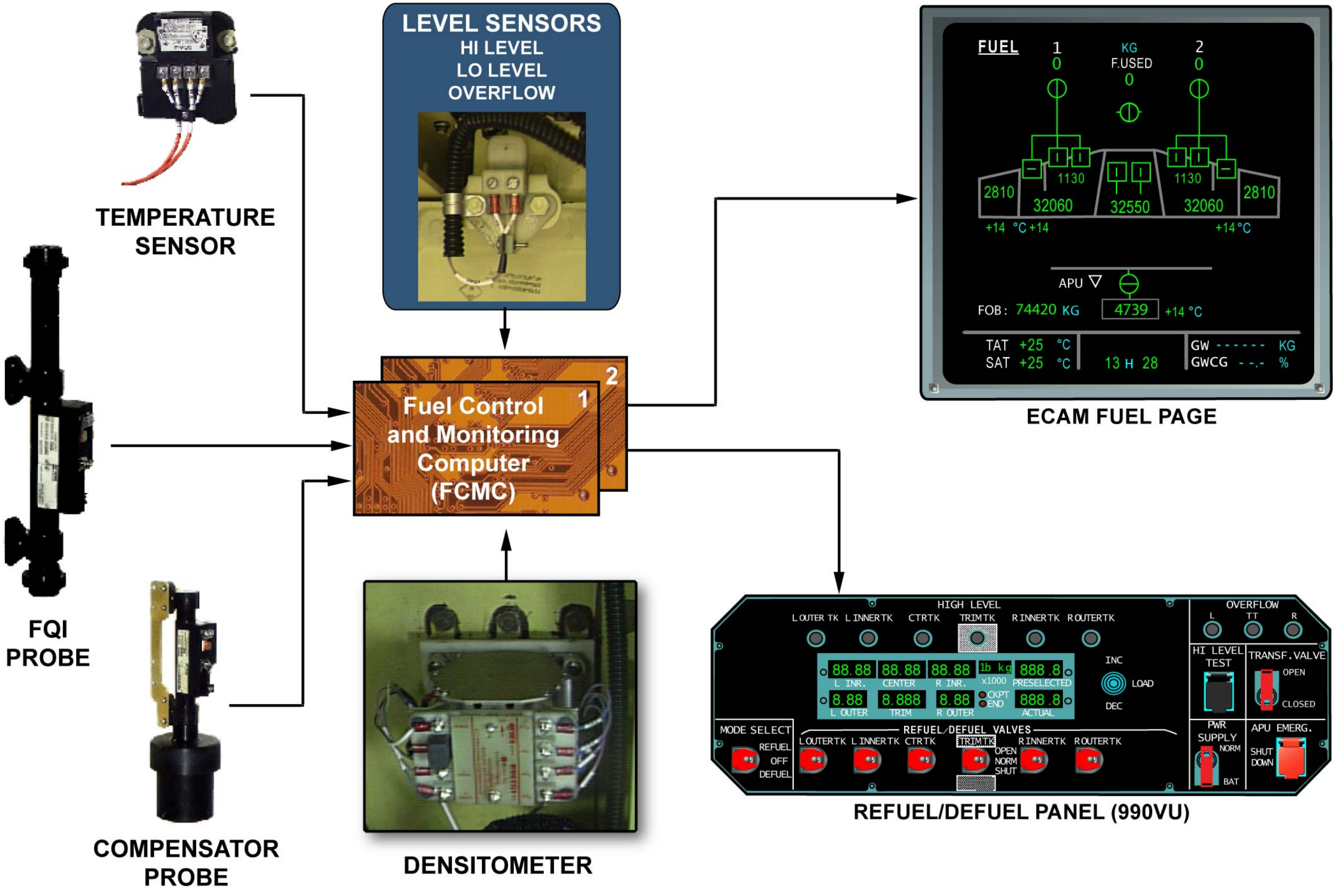


STORAGE

G6B08031 - G10T4T0 - FM28P8000000003


PROBES AND SENSORS
Fuel Control and Monitoring Computer (FCMC)
1
2
ECAM SYSTEM DISPLAY (SD) FUEL PAGE
REFUEL/DEFUEL PANEL (990VU)
FQI PROBE
T
TEMPERATURE SENSOR
HI - LEVEL SENSOR
LO - LEVEL SENSOR
OVERFLOW SENSOR
CENTER
INNER
OUTER
SURGE
TRIM
SURGE

STORAGE

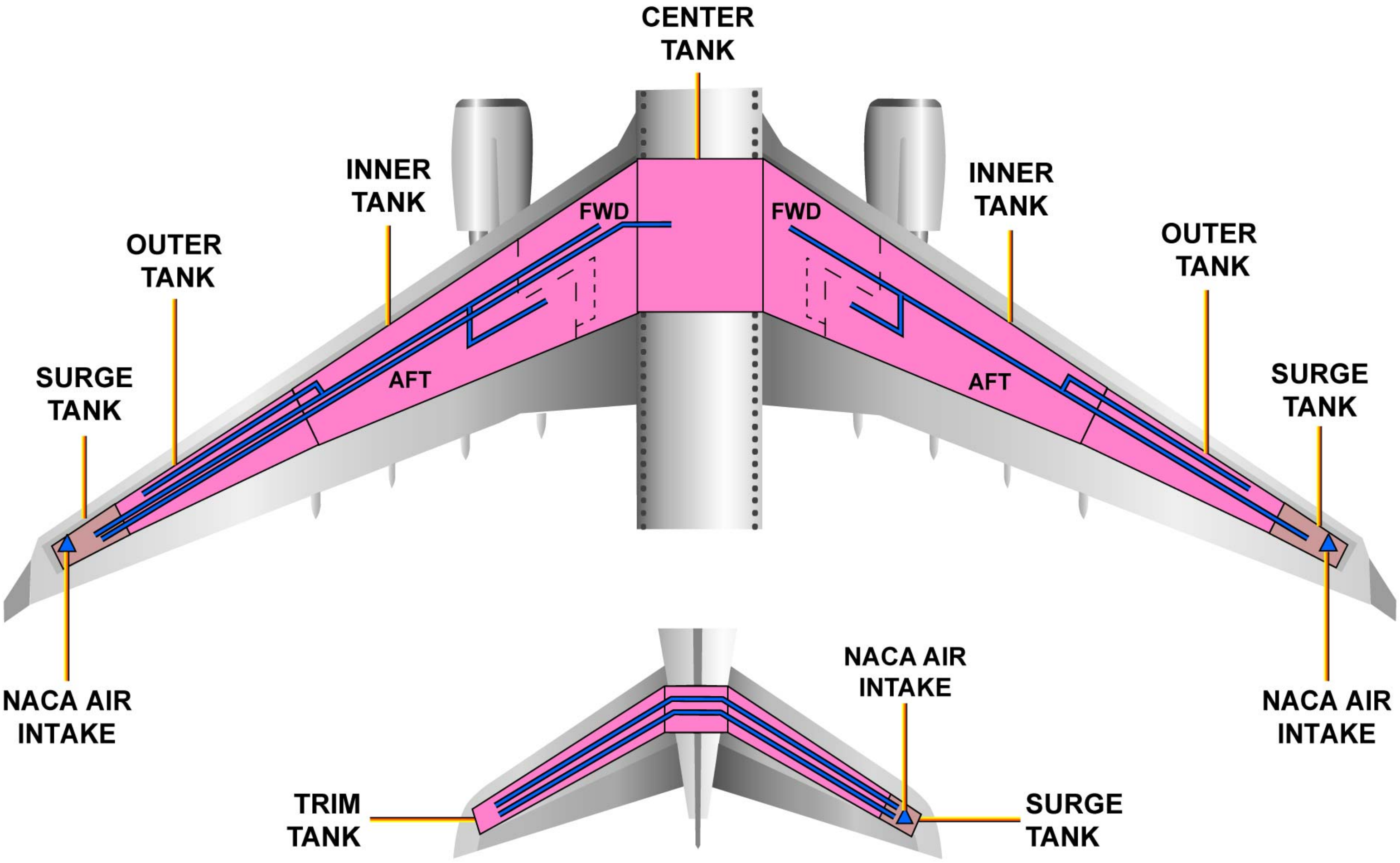

TEMPERATURE SENSOR
LEVEL SENSORS
HI LEVEL
LO LEVEL
OVERFLOW
FQI PROBE
Fuel Control and Monitoring Computer (FCMC)
1
2
COMPENSATOR PROBE
DENSITOMETER
ECAM FUEL PAGE
REFUEL/DEFUEL PANEL (990VU)

STORAGE

28 FUEL SYSTEM PRESENTATION (A330-200) (1)

TANK VENTING

Each wing tank and the trim tank are vented via dedicated vent pipes connected to their related vent surge tanks. The center tank is vented through the left wing vent surge tank. A NACA air intake is mounted on an access panel on each vent surge tank.

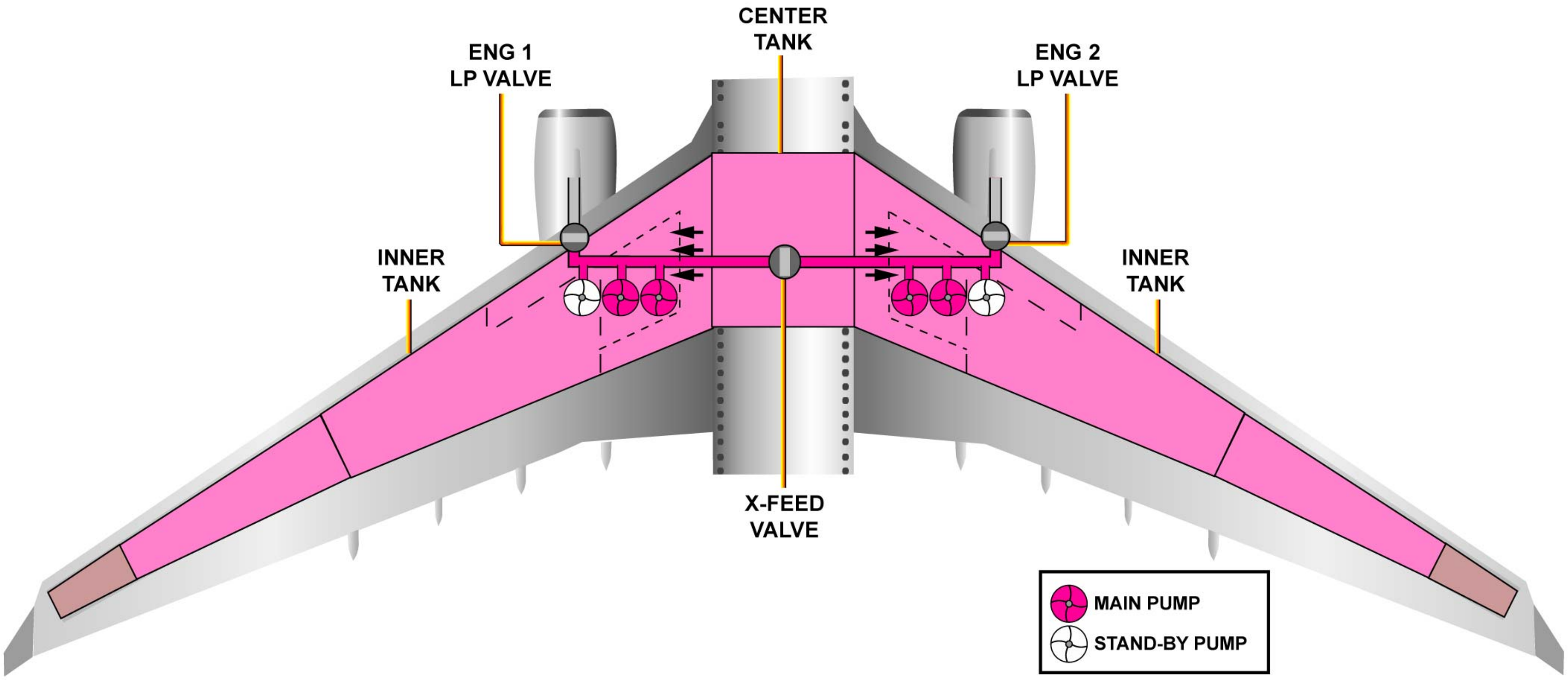


TANK VENTING

28 FUEL SYSTEM PRESENTATION (A330-200) (1)

ENGINE FEED

An independent fuel feed system supplies each engine. For each engine, there are two main fuel pumps, and one stand-by pump. In the normal configuration the main pumps are running and the stand-by pump is there as a back up when a main pump has a too low output pressure. A LP valve isolates its related engine from the fuel supply. The crossfeed system lets any engine be fed from any tank. It is used to correct fuel imbalance between tanks or during gravity feeding of the engines.



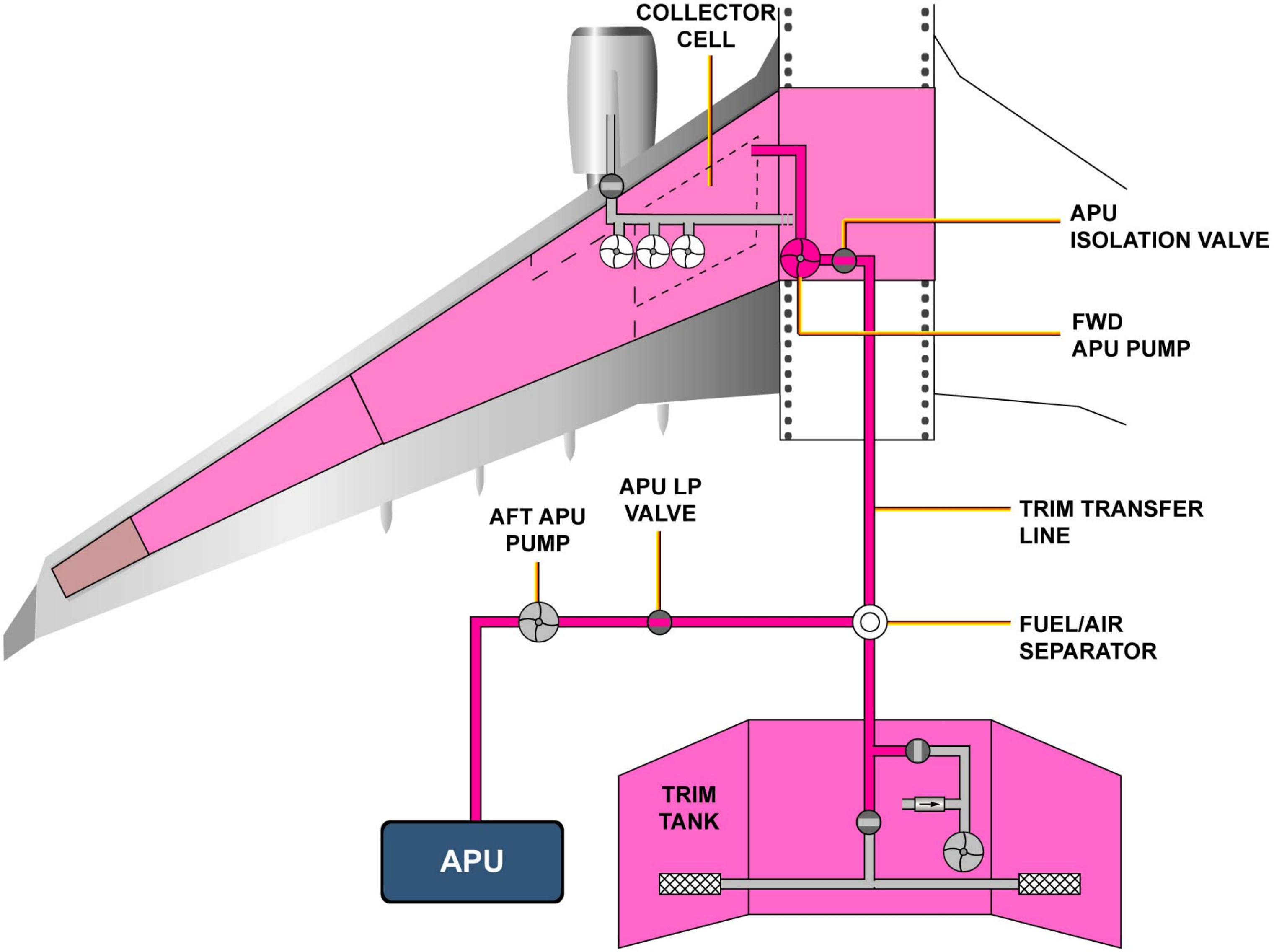
X-FEED: Cross-Feed

ENGINE FEED

28 FUEL SYSTEM PRESENTATION (A330-200) (1)

APU FEED SYSTEM

Fuel is supplied to the APU from the LH inner tank collector cell with the forward APU pump through the trim transfer line. If a low pressure is detected in the trim transfer line, the aft APU pump starts. The APU fuel isolation valve controls the fuel flow from the FWD inner tank to the trim transfer line. If an APU fire is detected, the APU LP valve closes. The Fuel/Air separator, installed in the trim tank fuel transfer line, keeps sufficient fuel for the APU operation if air enters the transfer line.



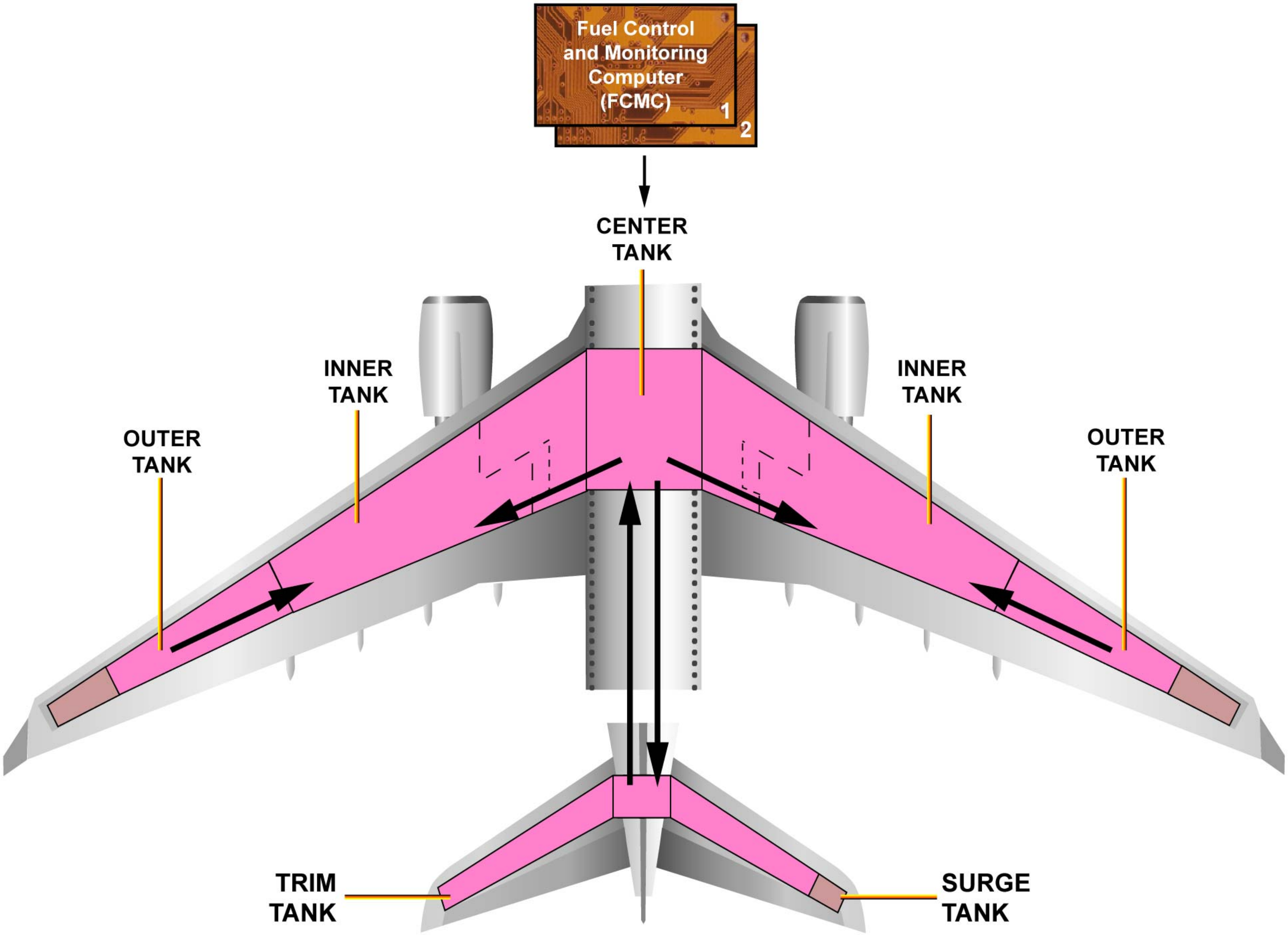
APU FEED SYSTEM

G6B08031 - G10T4T0 - FM28P8000000003

28 FUEL SYSTEM PRESENTATION (A330-200) (1)

MAIN AND TRIM TRANSFERS

The main transfer system controls the fuel flow from the center tank and the outer tanks to the two inner tanks for engine feeding. The two transfers are usually controlled automatically by the FCMCs, but they can be manually controlled if necessary. The trim transfer system controls the A/C center of gravity by forward and aft transfers. Trim transfers are controlled automatically by the FCMCs, but a manual forward transfer can be initiated from the fuel panel if a failure occurs.



MAIN AND TRIM TRANSFERS

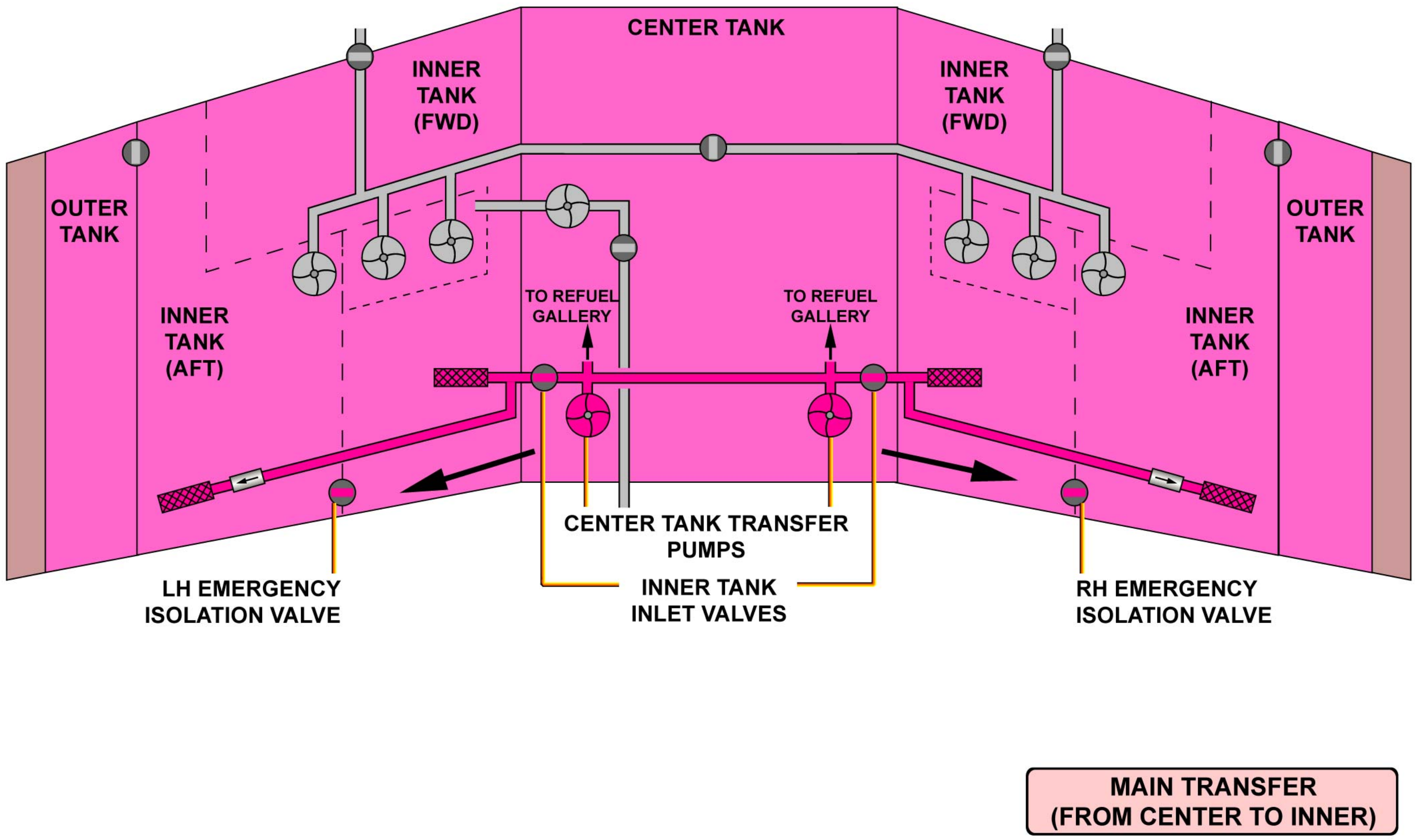
G6B08031 - G10T4T0 - FM28P8000000003

28 FUEL SYSTEM PRESENTATION (A330-200) (1)

MAIN AND TRIM TRANSFERS (continued)

MAIN TRANSFERS FROM CENTER TANK TO INNER TANK

Independent control, for each wing, allows transfers from the center tank to the inner tanks with the goal of emptying the center tank first and keeping the inner tanks full by cycles. When the fuel quantity of an inner tank decreases to the under full level, the FCMC automatically controls the transfer from the center tank to the related inner tank. The transfer stops automatically when that inner tank is full again.
The crew can manually control the transfer from the fuel panel. The system uses the pressure of center tank pumps to move the fuel from the center to the inner tank.
Two center tank fuel transfer pumps are used to move fuel, from the center tank to the inner tanks, via the main transfer gallery. For each wing, an inner tank inlet valve independently controls the flow of fuel from the main transfer gallery to the related inner tank. Two emergency isolation valves control the fuel flow between the forward and aft inner tanks. The valves are installed between the aft and forward inner tanks. During normal operation the emergency isolation valves are open. The crew has to manually close the emergency isolation valves to isolate the forward inner tank from the aft inner tank in case of leak in either the forward or aft inner tank.



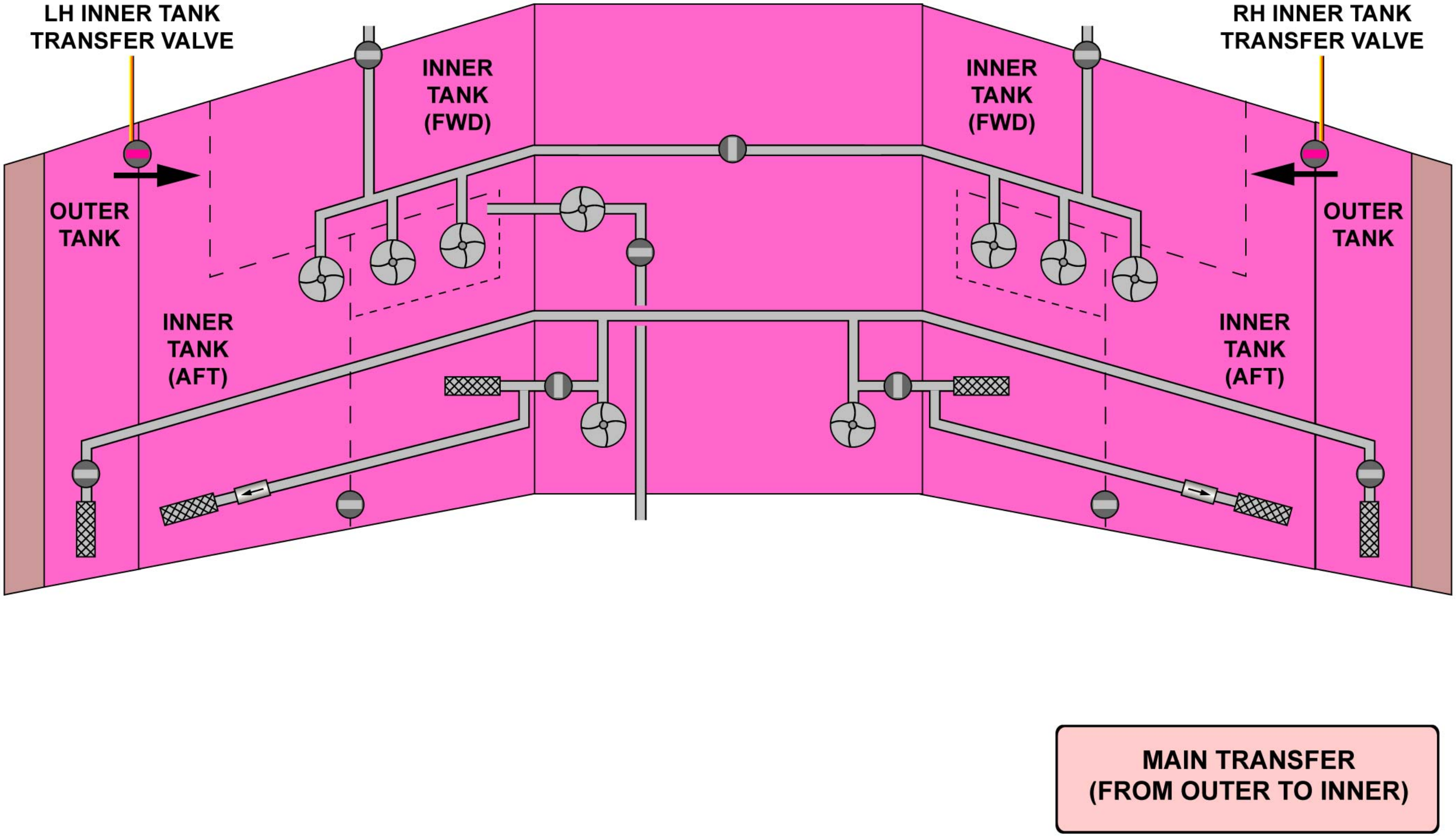
MAIN AND TRIM TRANSFERS - MAIN TRANSFERS FROM CENTER TANK TO INNER TANK

28 FUEL SYSTEM PRESENTATION (A330-200) (1)

MAIN AND TRIM TRANSFERS (continued)

MAIN TRANSFERS FROM OUTER TANK TO INNER TANK

The outer tank to inner tank transfer is automatically controlled by the FCMC when the fuel quantity in one of the inner tanks decreases to a low level. The crew can manually control the transfers from the fuel panel. The system uses gravity to transfer the fuel from the outer tanks to the inner tanks.
The FCMC opens the valves when the inner tank fuel level is too low.
The FCMC commands the LH and RH inter-tank transfer valves simultaneously in both wings to keep lateral balance.



G6B08031 - G10T4T0 - FM28P8000000003

MAIN AND TRIM TRANSFERS - MAIN TRANSFERS FROM OUTER TANK TO INNER TANK

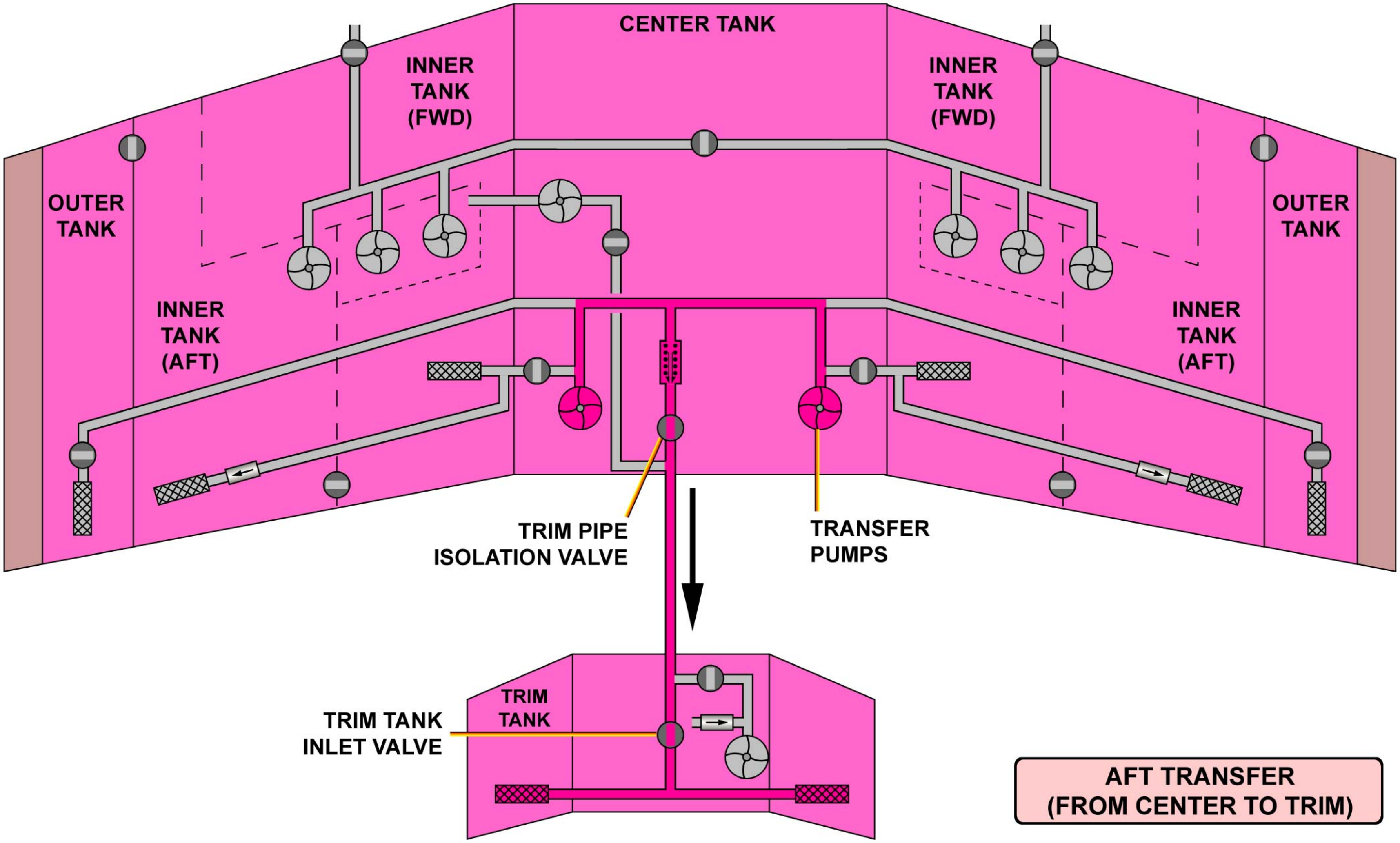
28 FUEL SYSTEM PRESENTATION (A330-200) (1)

MAIN AND TRIM TRANSFERS (continued)

AFT TRIM TRANSFERS

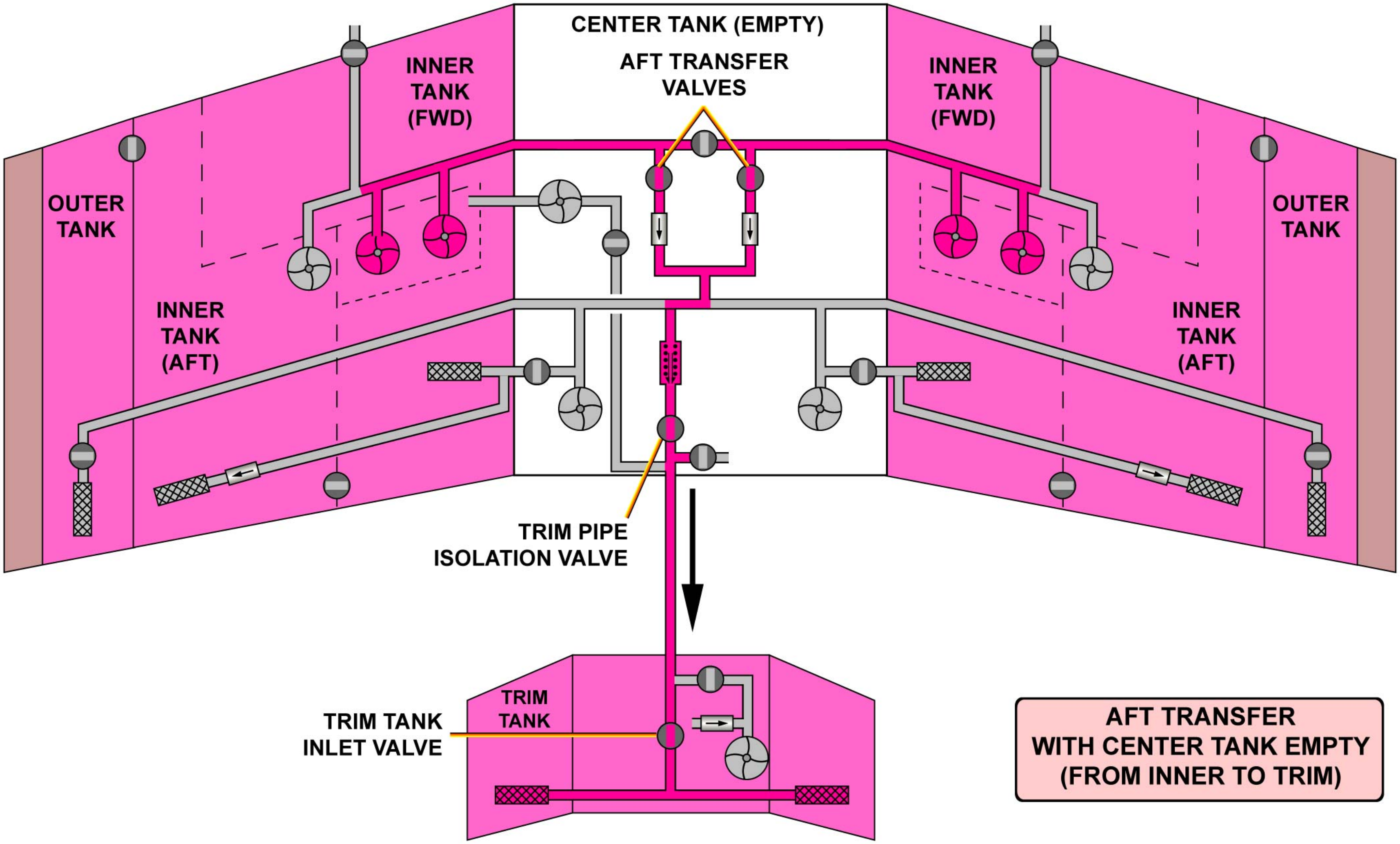
The trim transfer system controls the A/C CG position. For this function, the system moves fuel to the trim tank (this is the aft transfer), or from the trim tank (this is the forward transfer). When an aft transfer is necessary:
- if the center tank is not empty, the center tank pumps move fuel from the center tank to the trim tank,
- if the center tank is empty, the booster pumps move fuel from the collector cells to the trim tank.

The system operates automatically via the FCMC. However, the crew can manually set a forward transfer on the fuel panel.
You can transfer fuel between the center tank and the trim tank. The transfer pumps fill the trim tank via the trim pipe isolation valve and the trim tank inlet valves.
The aft transfer uses the main pumps to fill the trim tanks when the center tank is empty. The system uses the aft transfer valves, the trim pipe isolation valve and the trim tank inlet valve. The fuel is pumped from the inner tanks.



MAIN AND TRIM TRANSFERS - AFT TRIM TRANSFERS

G6B08031 - G10T4T0 - FM28P8000000003



MAIN AND TRIM TRANSFERS - AFT TRIM TRANSFERS

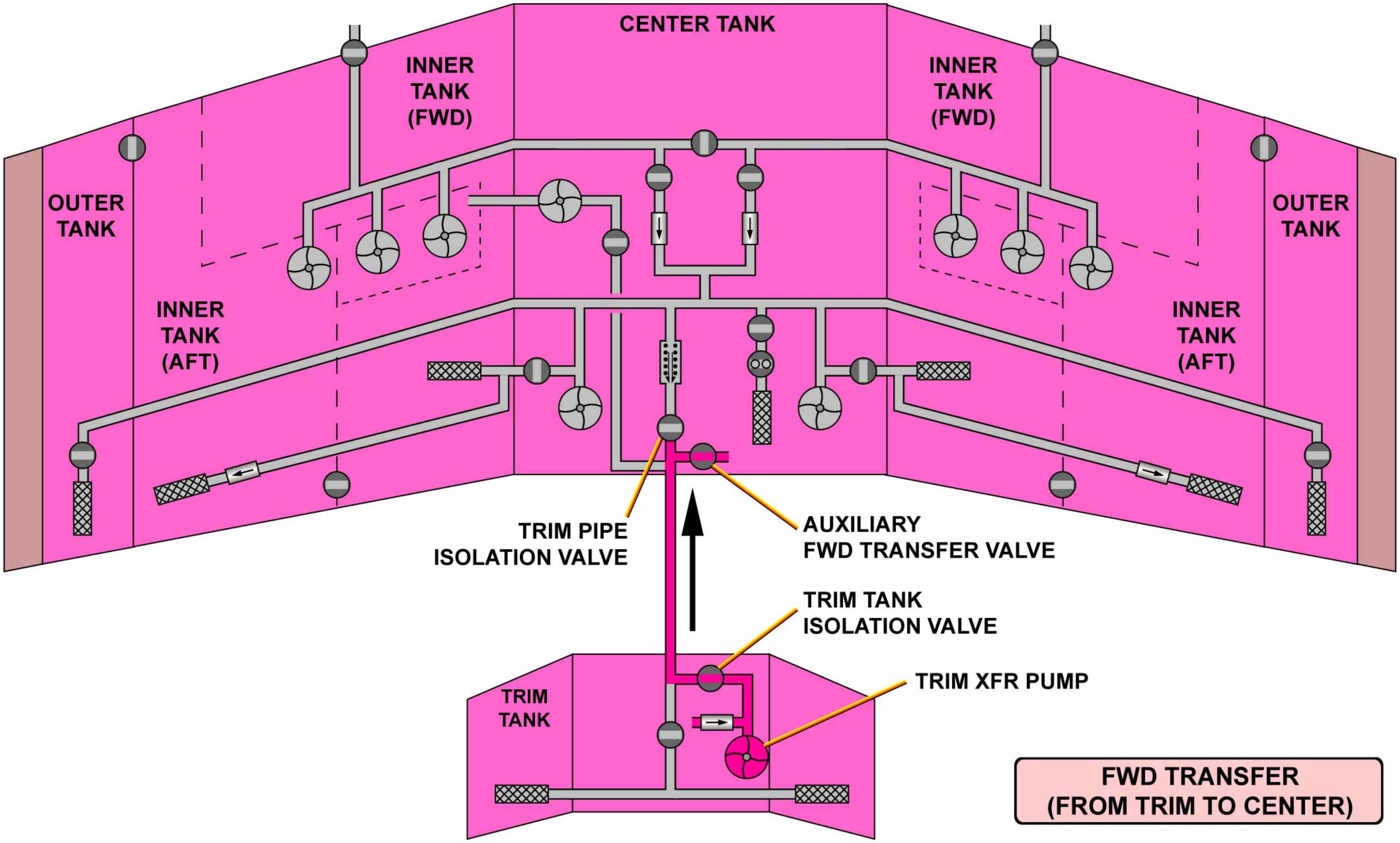
This Page Intentionally Left Blank

28 FUEL SYSTEM PRESENTATION (A330-200) (1)

MAIN AND TRIM TRANSFERS (continued)

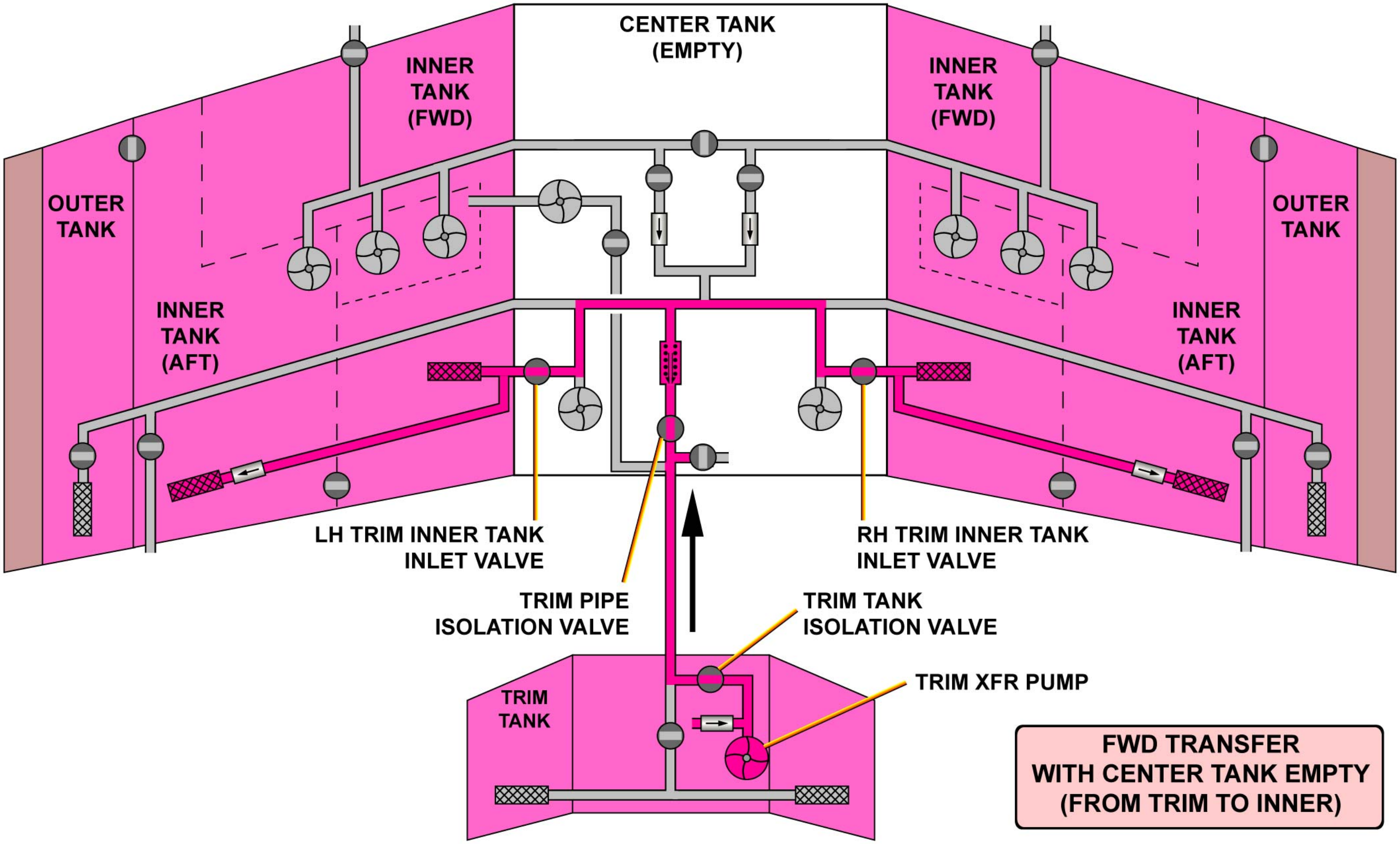
FORWARD TRIM TRANSFERS

When a forward transfer is necessary with the center tank not empty, the trim tank transfer pump moves fuel from the trim tank to the center tank. The fuel can be transferred to the center tank, by the trim transfer pump, through the trim tank isolation valve and the auxiliary forward transfer valve. The FCMC opens the auxiliary forward transfer valve. During an automatic forward transfer when the center tank is empty, a trim transfer pump moves fuel from the trim tank to the inner tanks. The fuel can be transferred to the inner tanks by the trim transfer pump, through the trim tank isolation valve, the trim pipe isolation valve and the inner tank inlet valves. The FCMC opens the inner tank inlet valves.



MAIN AND TRIM TRANSFERS - FORWARD TRIM TRANSFERS

G6B08031 - G10T4T0 - FM28P8000000003



MAIN AND TRIM TRANSFERS - FORWARD TRIM TRANSFERS

G6B08031 - G10T4T0 - FM28P8000000003

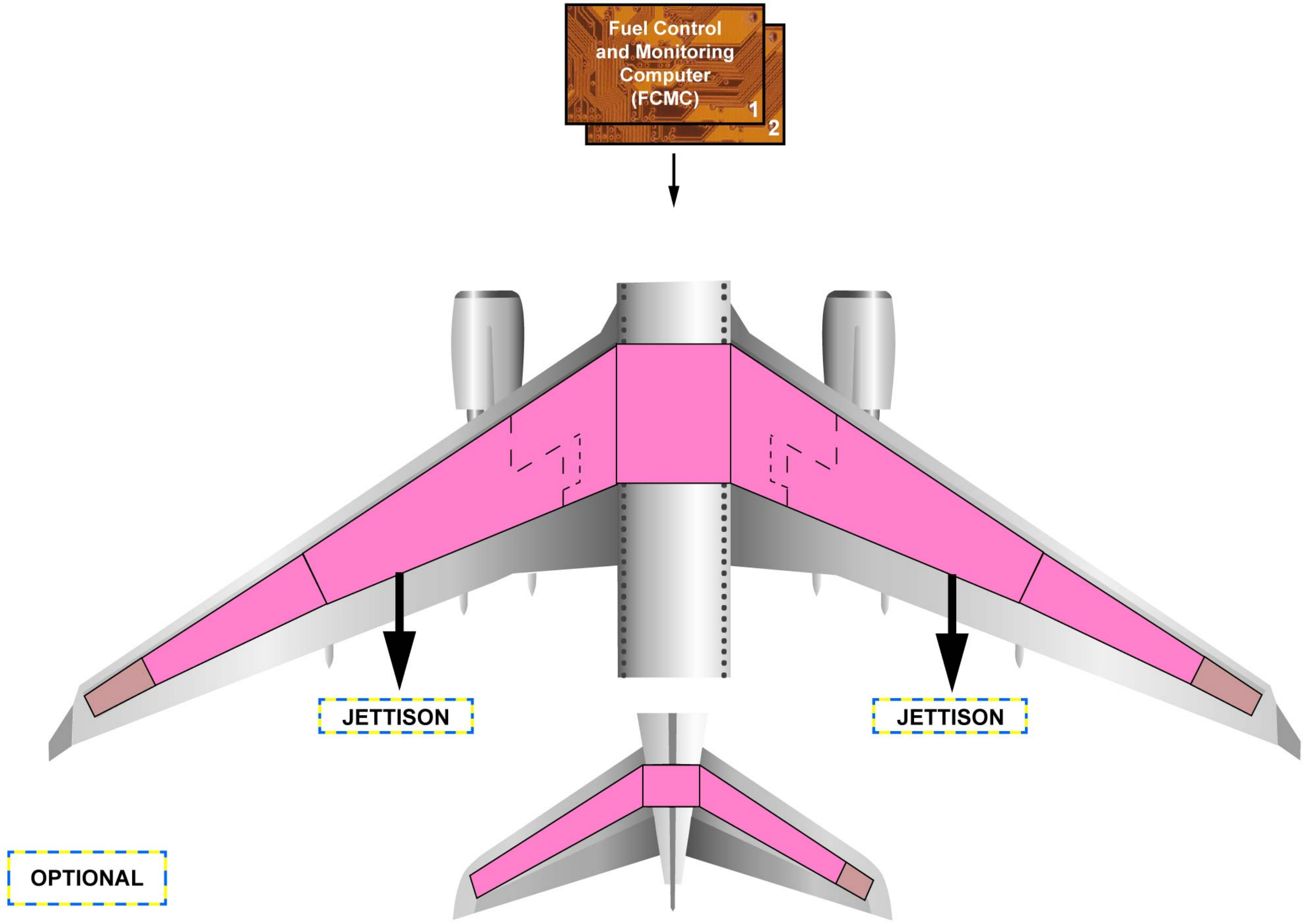
This Page Intentionally Left Blank

28 FUEL SYSTEM PRESENTATION (A330-200) (1)

JETTISON (OPTIONAL)

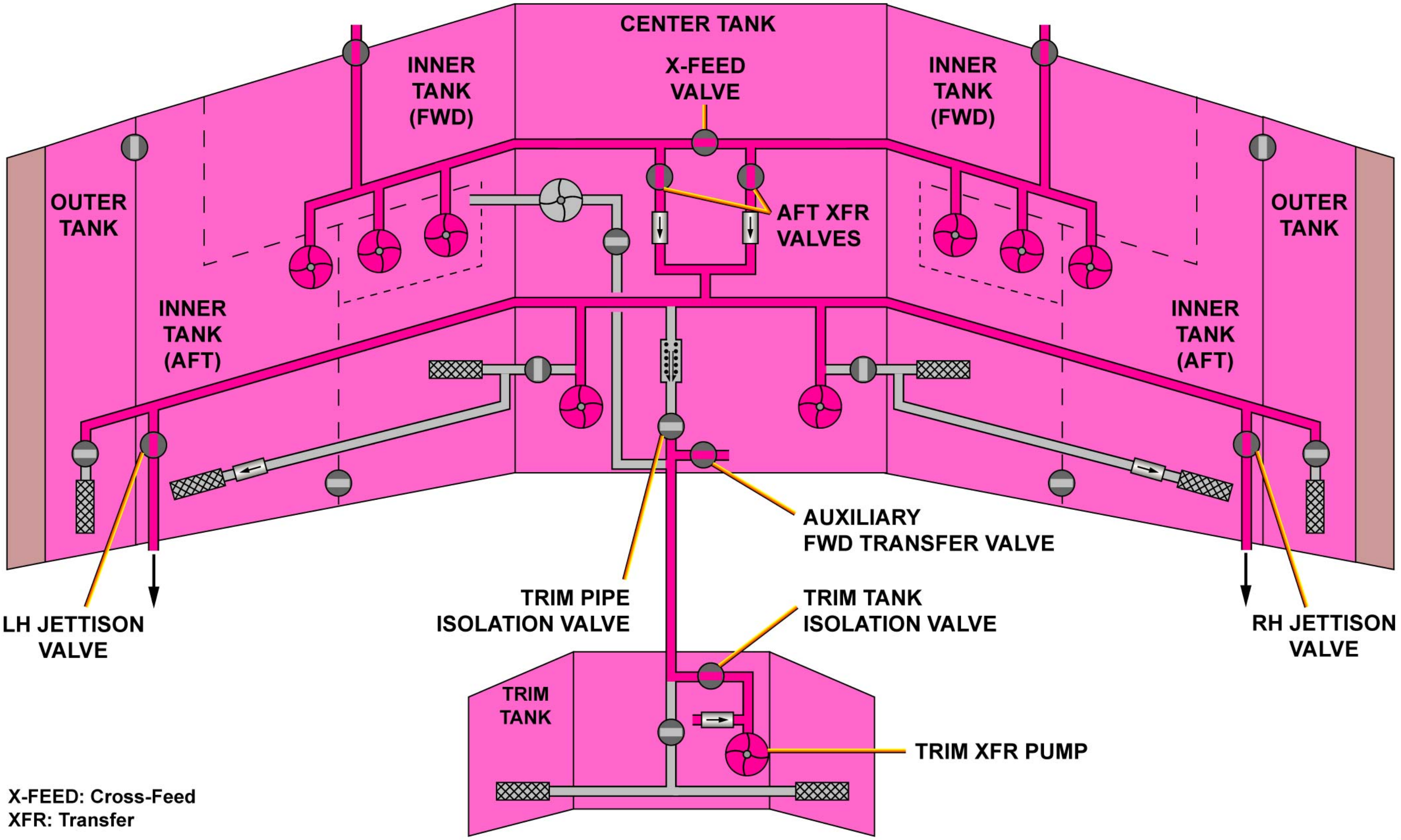
When installed, the jettison system is used in flight to dump fuel overboard, to decrease the A/C gross weight before landing. The jettison system operation can only be manually initiated in the cockpit on the jettison panel but the Fuel Control and Monitoring Computer (FCMC) can manually or automatically stop the jettison system.
When the jettison system is set to ON:
- the two jettison valves open,
- the trim-pipe isolation valve opens and all the fuel tank inlet valves close,
- the two transfer pumps supply fuel from the center tank,
- the two aft transfer valves open,
- the crossfeed valve opens,
- all the main and standby pumps supply fuel from the inner tank,
- trim tank FWD transfer is automatically initiated to the center tank even if the center tank is empty,
- the fuel flows from the fuel tanks to the refuel gallery.

The system can be manually stopped by the crew, or automatically if the FCMC stops the operation at a pre-set jettison final gross weight or when inner tank low-level sensors become dry. When the total of the two inner tanks fuel quantities is less than 10 tons the jettison system stops automatically.



JETTISON (OPTIONAL)

G6B08031 - G10T4T0 - FM28P8000000003



JETTISON (OPTIONAL)

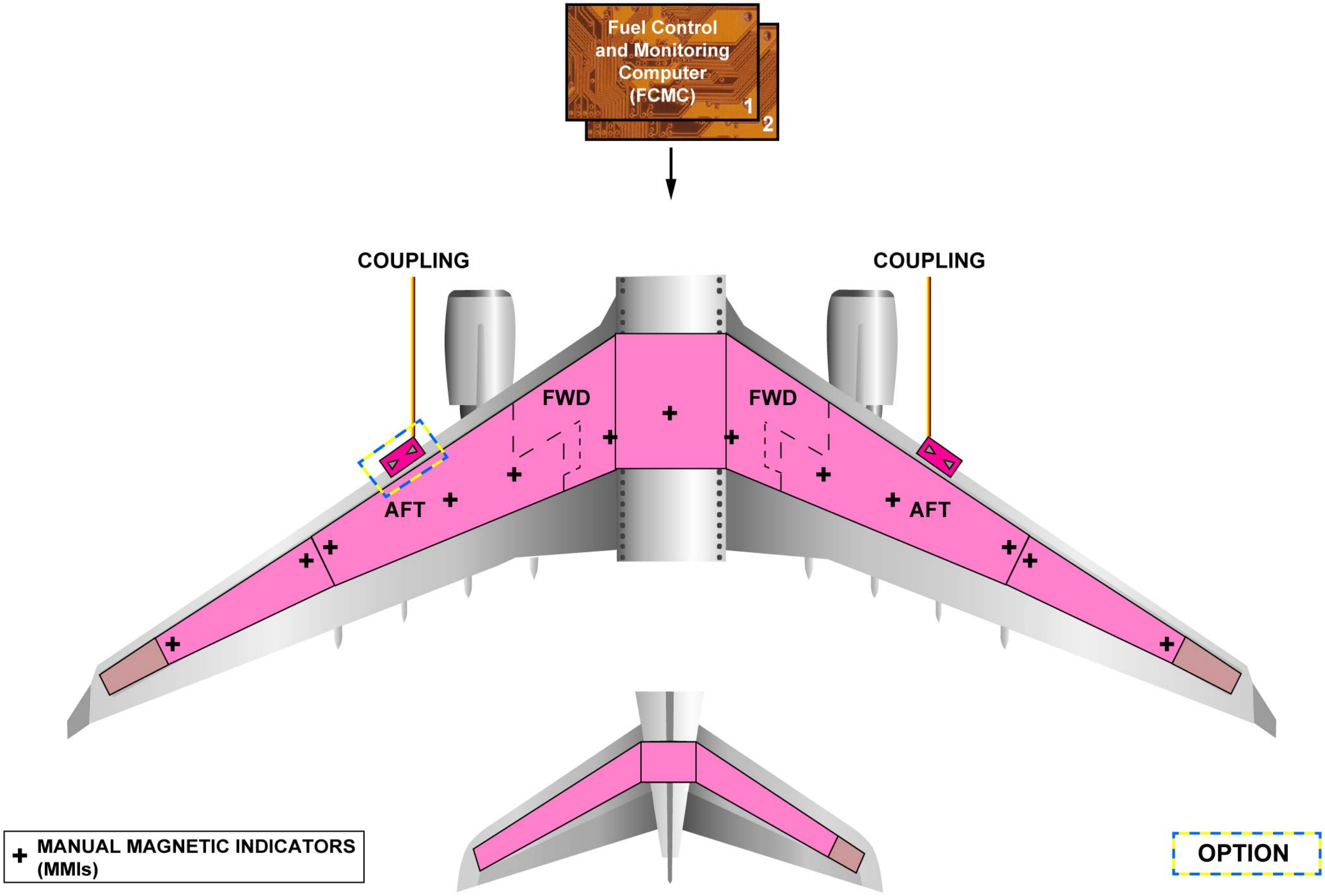
This Page Intentionally Left Blank

28 FUEL SYSTEM PRESENTATION (A330-200) (1)

REFUEL/DEFUEL

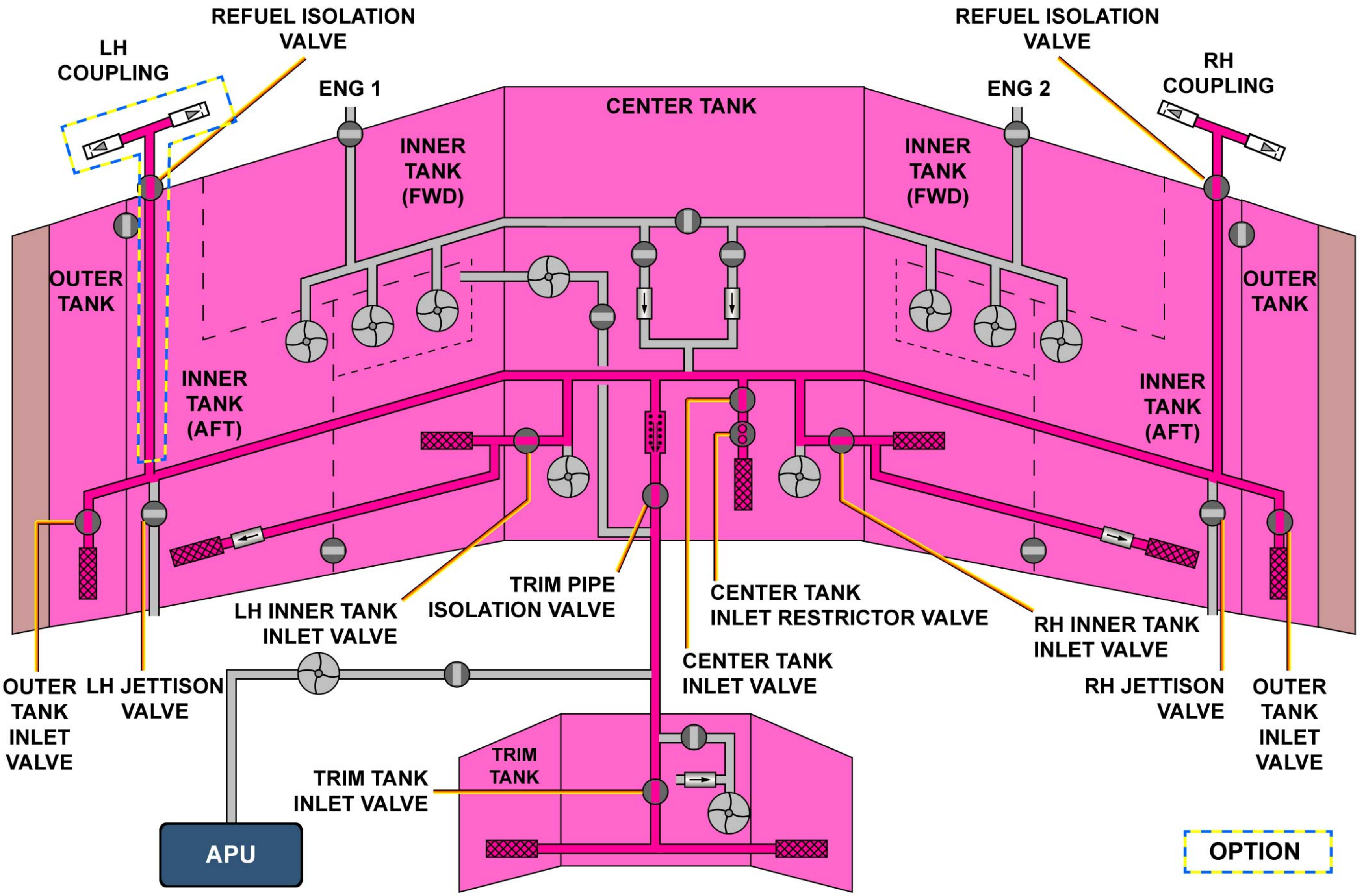
On ground, the A/C can be refueled automatically or manually, defueled with pressure or suction. Fuel can be transferred from tank to tank. Two refuel/defuel (LH optional) couplings are installed in the leading edge of each wing allowing simultaneous refueling from the right and the left sides of the A/C. The FCMCs control the refuel/defuel and transfer operations. In case of fuel quantity indication failure, the fuel quantities can be determined by using the tank Manual Magnetic Indicators (MMIs). A refuel/defuel coupling installed in the leading edge of each wing is the interface between the Refuel/Defuel system and the external fuel source. Each coupling has two adaptors allowing the aircraft to be refueled from four hoses at the same time. The refuel isolation valve controls the fuel supply from the refuel coupling to the refuel gallery. The outer tank inlet valve controls the flow of fuel into the outer tank. The inner tank inlet valve independently controls the flow of fuel from the refuel gallery to the inner tank. The center tank inlet valve controls the flow of fuel from the refuel gallery into the center tank. The center tank inlet restrictor valve prevents an overpressure of the center tank structure during a refuel operation. The fuel flows into the trim tank via the trim pipe isolation valve and the trim tank inlet valve. Fuel flows into each tank through diffusers.

G6B08031 - G10T4T0 - FM28P8000000003



REFUEL/DEFUEL

G6B08031 - G10T4T0 - FM28P8000000003



REFUEL/DEFUEL

G6B08031 - G10T4T0 - FM28P8000000003

This Page Intentionally Left Blank

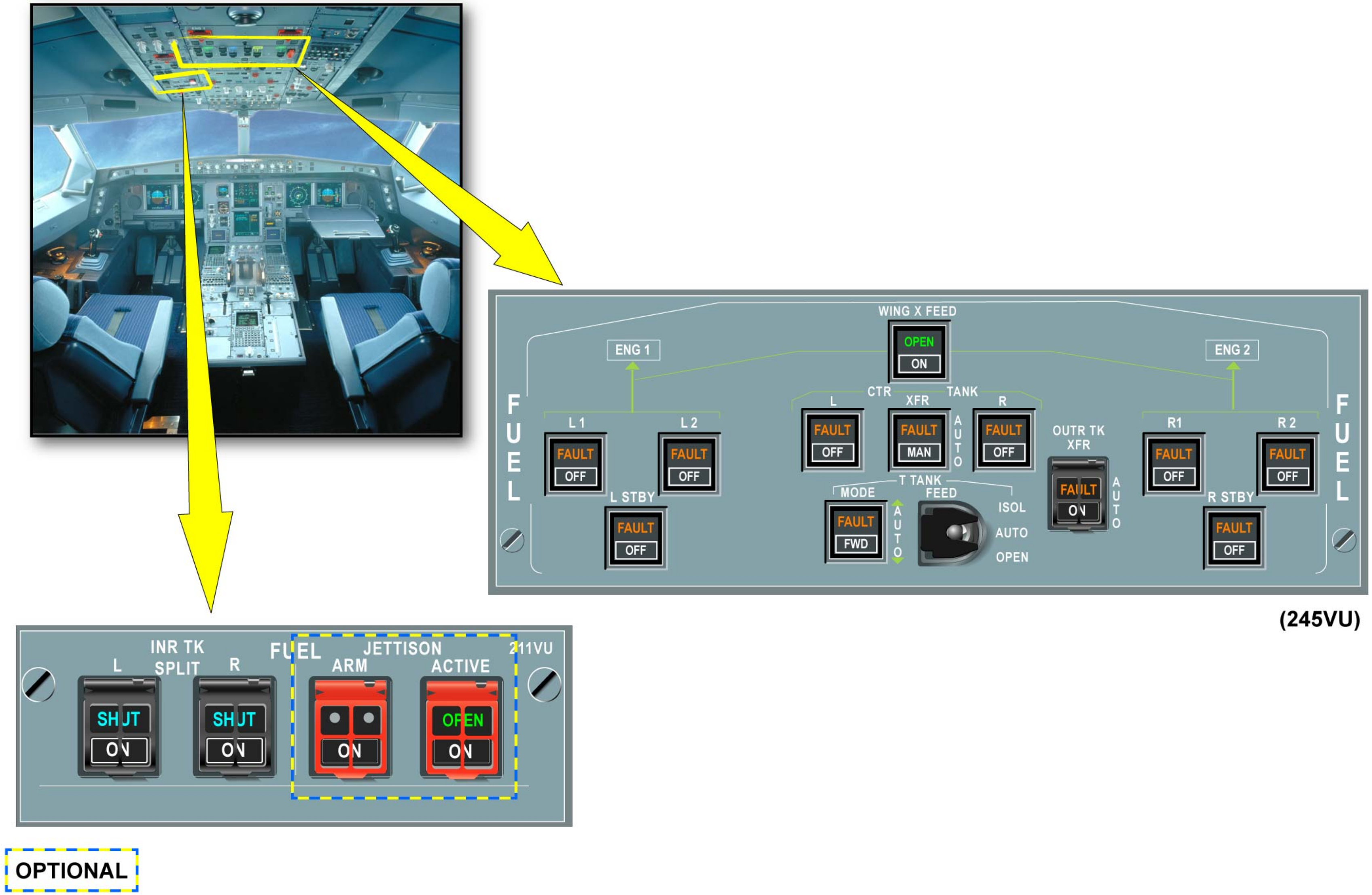
28 FUEL SYSTEM PRESENTATION (A330-200) (1)

CONTROL AND INDICATING

This section will highlight the control panels and indications for the fuel system.

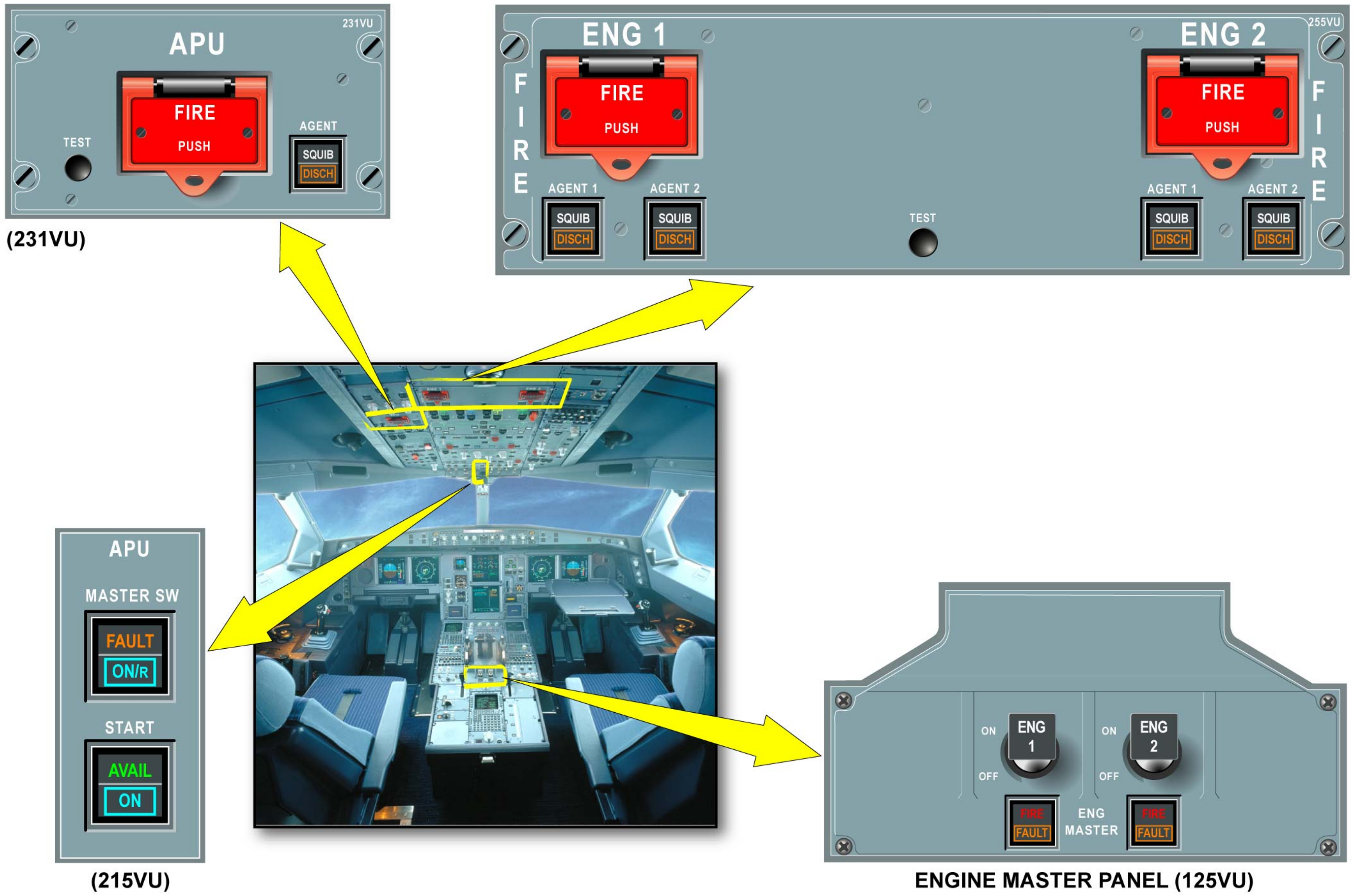
CONTROL PANELS

The FUEL control panel is located on the overhead panel. Each main and stand-by pump has its related control P/BSW for each related engine collector cell. The cross feed valves normally closed may be controlled open automatically in case of electrical emergency configuration or manually by their dedicated P/BSWs.
The LH and RH CTR TANK P/BSWs on the cockpit fuel panel, control the related center tank fuel transfer pump. The CTR TK XFR P/BSW is manually or automatically used to control the transfer from the center tank to the inner tank.
An action on the LH or RH INR TK SPLIT P/BSW located on the fuel emergency control panel is used for manual control of the emergency isolation valves. The OUTER TK XFR P/BSW on the fuel control panel, is used to manually or automatically control the outer tank fuel transfer to the inner tanks. The T TANK MODE P/BSW on the fuel control panel is used to manually or automatically control the Trim Tank transfer.
The T TANK FEED control selector is used to ISOLAte, to OPEN, and to AUTOmatically control the Trim tank fuel transfer. The Jettison system is ARMed and ACTIVated by the related P/BSW located on the fuel emergency control panel.
The LP valves are open or closed using their related ENG MASTER switch on the pedestal panel. In case of fire an action on the engine FIRE P/B on the overhead panel closes its related LP valve. The APU MASTER SW on the overhead panel controls the APU fuel supply. In case of APU fire, an action on the APU FIRE P/B on the overhead panel closes the APU LP valve.



CONTROL AND INDICATING - CONTROL PANELS

G6B08031 - G10T4T0 - FM28P8000000003



CONTROL AND INDICATING - CONTROL PANELS

G6B08031 - G10T4T0 - FM28P8000000003

This Page Intentionally Left Blank

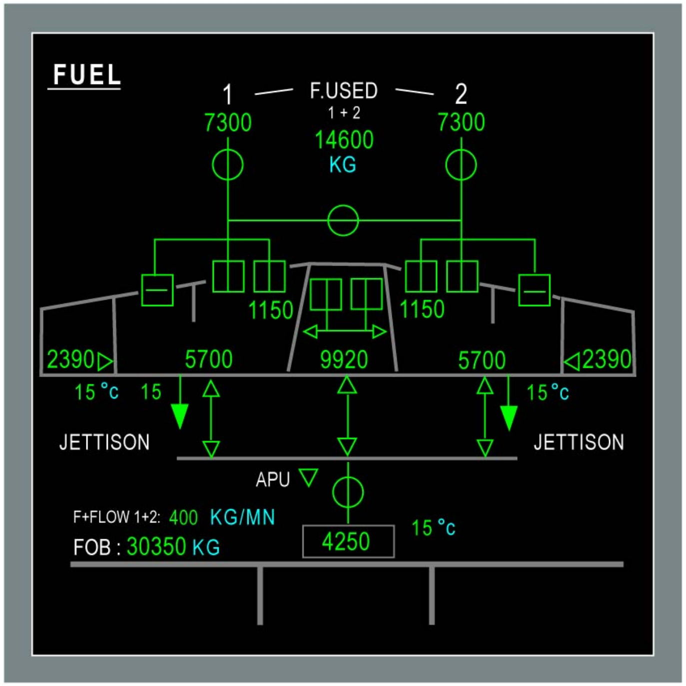
28 FUEL SYSTEM PRESENTATION (A330-200) (1)

CONTROL AND INDICATING (continued)

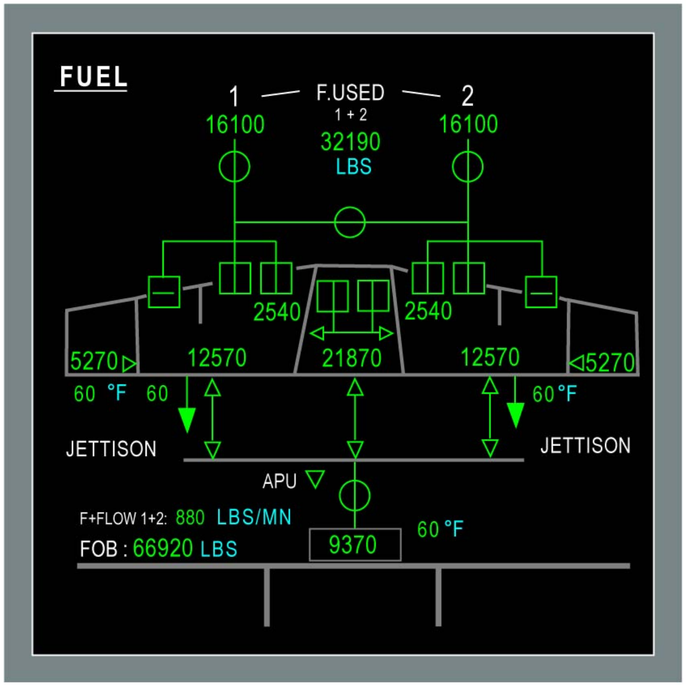
ECAM FUEL PAGE

The engine feed status, the APU feed status, the transfer data status, and the Jettison system status are all displayed on the ECAM FUEL page.

The DUs show all indications available but not a system configuration



FUEL ECAM PAGE
(METRIC)



FUEL ECAM PAGE
(US)

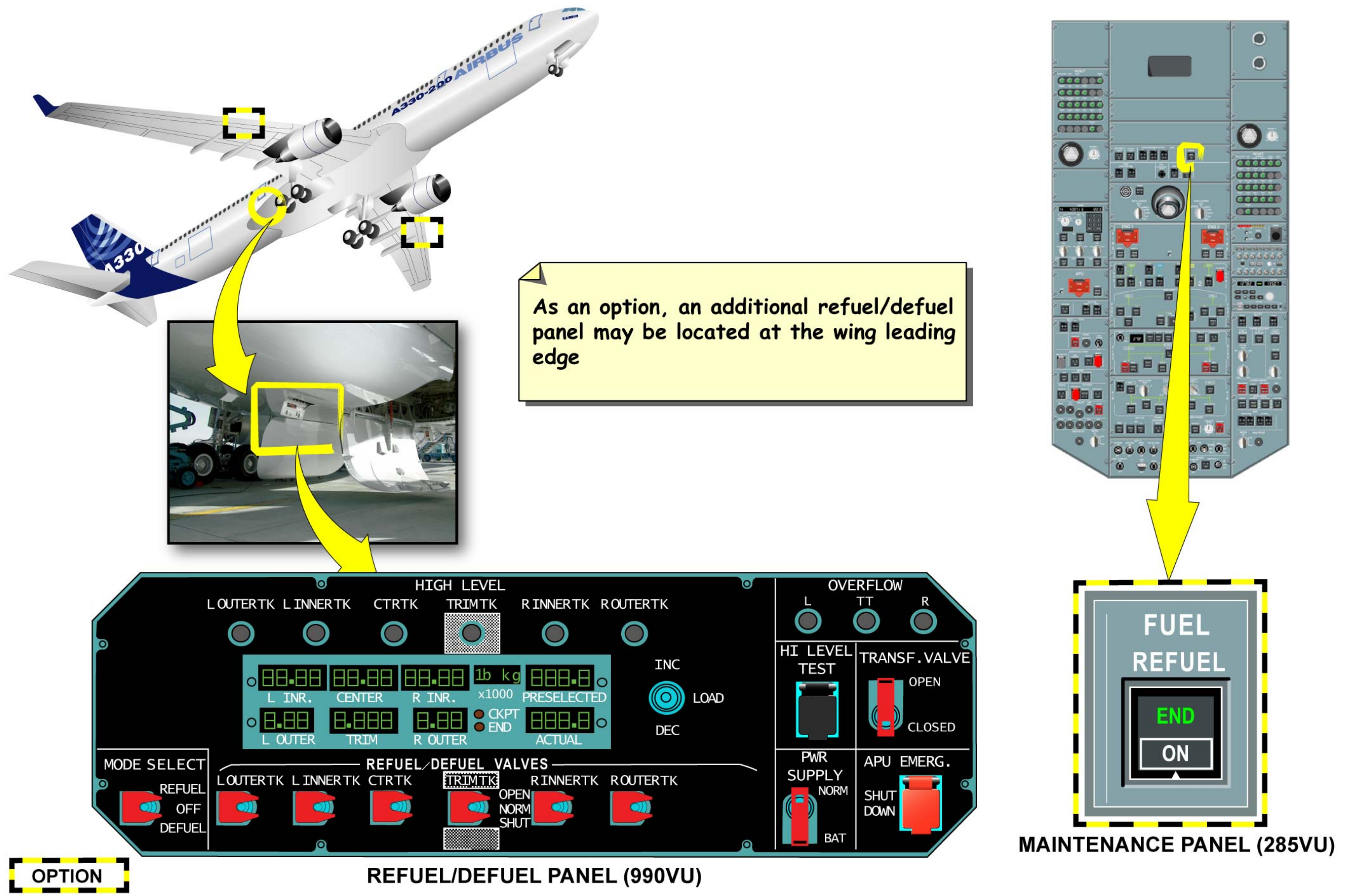
CONTROL AND INDICATING - ECAM FUEL PAGE

28 FUEL SYSTEM PRESENTATION (A330-200) (1)

CONTROL AND INDICATING (continued)

REFUEL/DEFUEL

On ground, the A/C can be refueled automatically or manually, defueled with pressure or suction, and fuel can be transferred from tank to tank. Two refuel/defuel couplings are installed in the leading edge of each wing allowing simultaneous refueling from the right and the left sides of the A/C. Refueling can be controlled and monitored from the refuel/defuel panel or optionally from the cockpit. The FCMCs control the refuel/defuel and transfer operations. The option for the fuel system, which may be selected by operators is additional Refuel/Defuel panels located at the LH or/and RH wing leading edge.



CONTROL AND INDICATING - REFUEL/DEFUEL

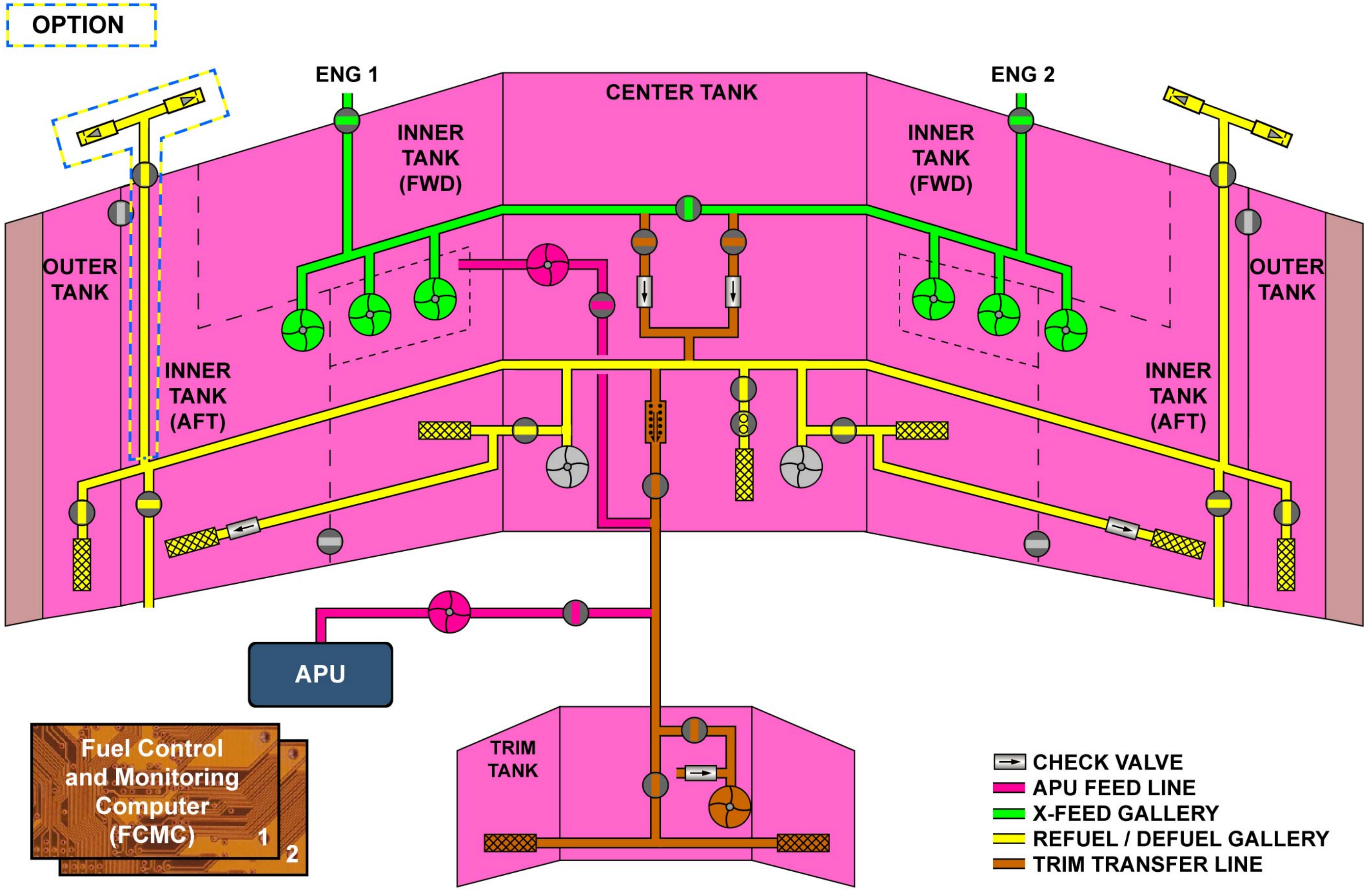
G6B08031 - G10T4T0 - FM28P8000000003

28 FUEL SYSTEM PRESENTATION (A330-200) (1)

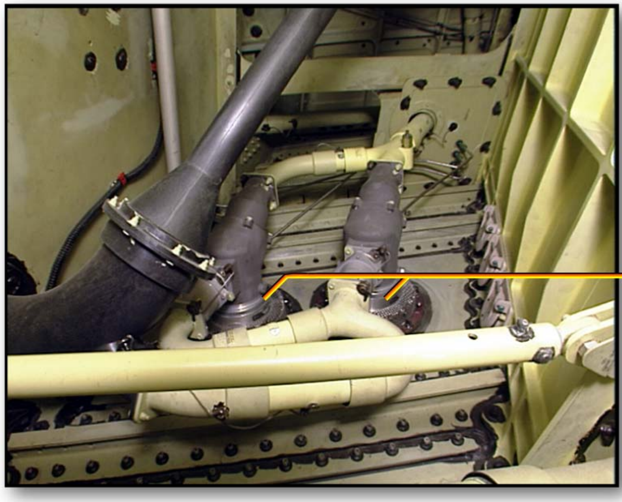
COMPONENT LOCATION

This is a global view of the fuel system.
The wing fuel feed pumps are replaced from the wing lower surface by removing the wing pump access fairing. The fuel pump element of the fuel pump canister can be replaced when there is fuel in the collector cell. The water drain valve lets remove water, which could collect a quantity sufficient to cause malfunction to the engine.
The LH and RH Refuel/Defuel couplings are located beneath the LH and RH wing leading edge. There is one refuel isolation valve per coupling. Each refuel isolation valve has a Manual Button. When pressed, the manual button holds the valve open, with the fuel pressure coming from the fuel tanker event, with lack of electrical failure. The Manual Magnetic level Indicators (MMIs) are used to calculate the tank fuel quantities without electrical power on the aircraft.
The X-feed valve actuator is installed on the center tank bottom skin. It controls the flow of fuel between Engine 1 and 2 feed lines.
The CTK inlet valve actuator is located on the CTK rear spar and controls the flow of fuel from the refuel gallery into the CTK.
The inner tank inlet valves actuators are installed on the center tank rear spar. They independently control the flow of fuel coming from the refuel gallery to the inner tanks.
The FWD APU pump, APU isolation valve actuator and Trim pipe isolation valve actuators are installed at the rear spar of the wing center tank. The AFT APU pump and APU LP valve are located in the tail cone section.
The TT inlet valve actuator is attached to the bottom skin of the TT, it controls the flow of fuel into the trim tank.
The trim-tank isolation valve is installed on the trim transfer line below the trim tank at Trimmable Horizontal Stabilizer RH. The actuator is attached to the valve.

The aft transfer valves actuators are installed at the rear face of the wing rear spar, they control the supply of fuel from the engine feed line to the refuel gallery.
The emergency isolation valves actuators are installed below the center tank, they control the flow of fuel between the AFT and the FWD inner tanks.



COMPONENT LOCATION

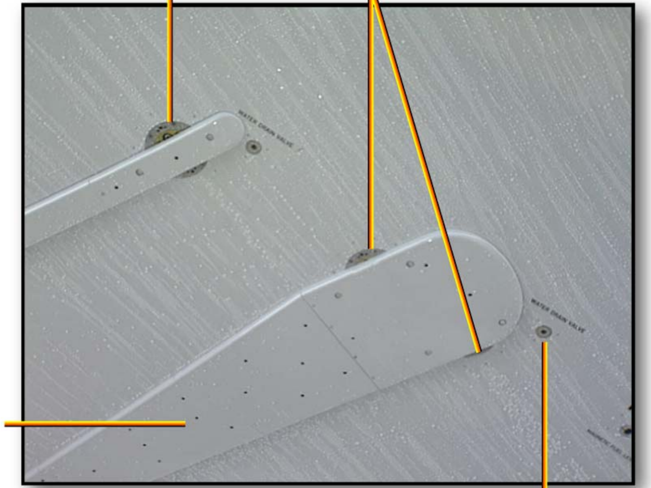


FUEL PUMP CANISTERS

COLLECTOR CELL

STBY PUMP

MAIN PUMPS

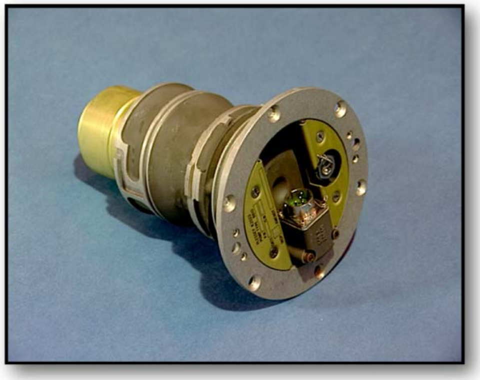


WING PUMP ACCESS FAIRING

WING TANK PUMP ACCESS

WATER DRAIN VALVE

FUEL PUMP CANISTER



FUEL PUMP

Each pump is installed in a canister which is also installed at the bottom of the tank.

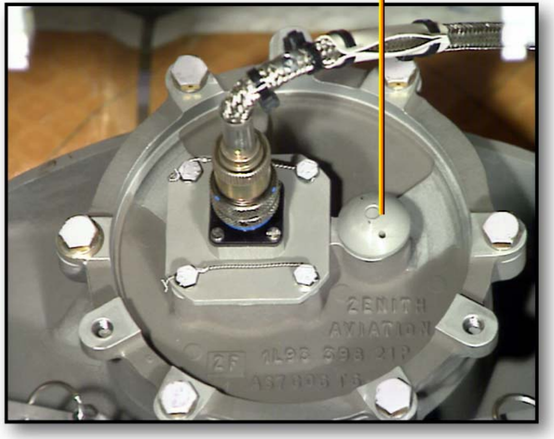
COMPONENT LOCATION

G6B08031 - G10T4T0 - FM28P8000000003

REFUEL COUPLING

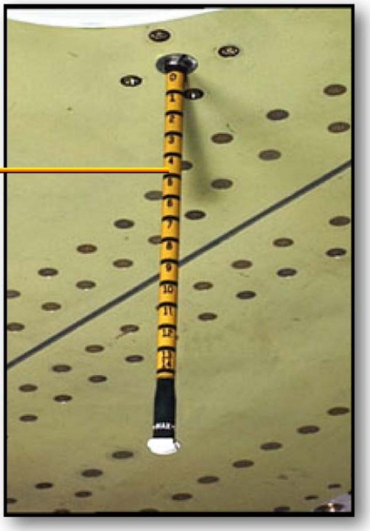
MAGNETIC FUEL LEVEL

MANUAL OVERRRIDE

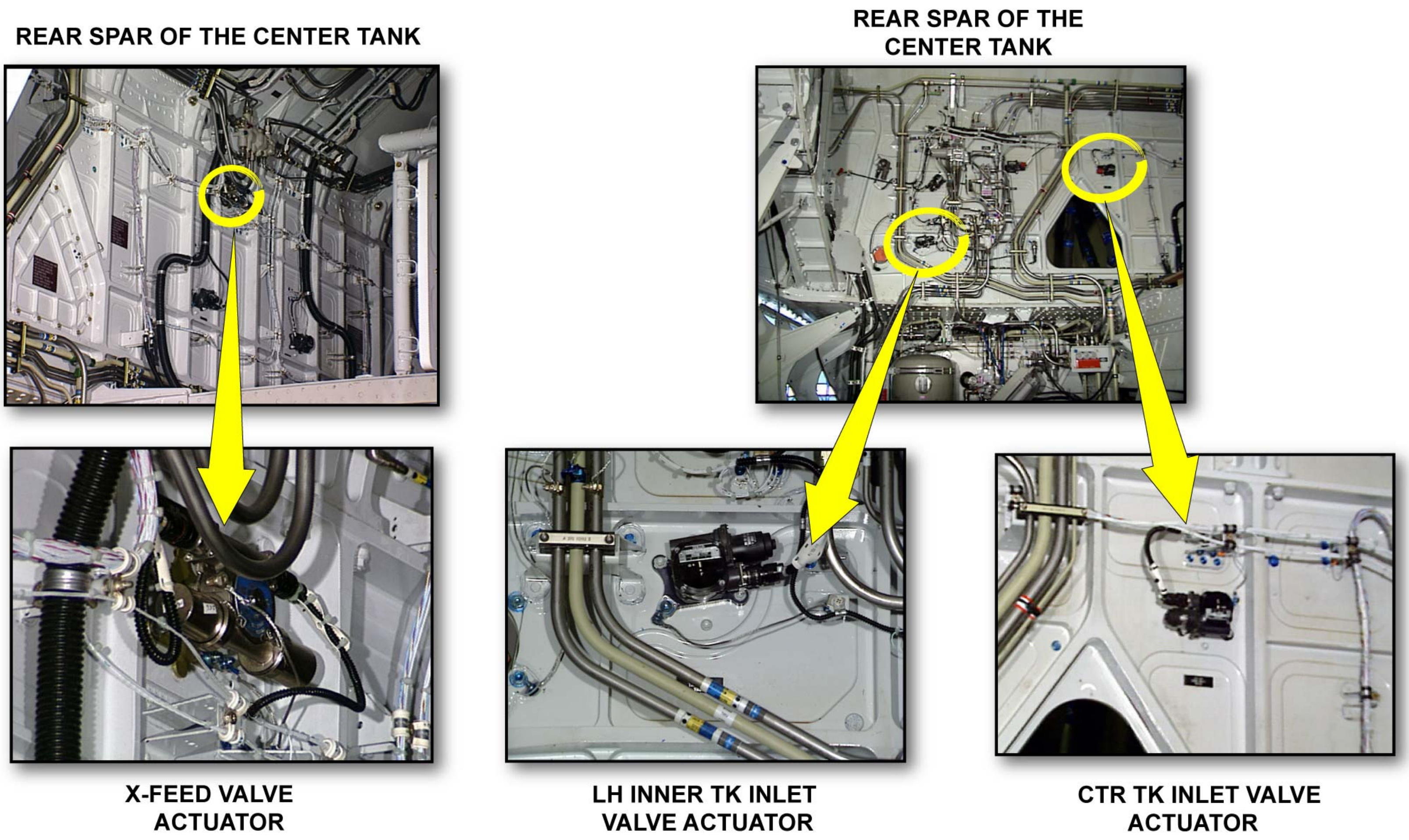


REFUEL ISOLATION VALVE

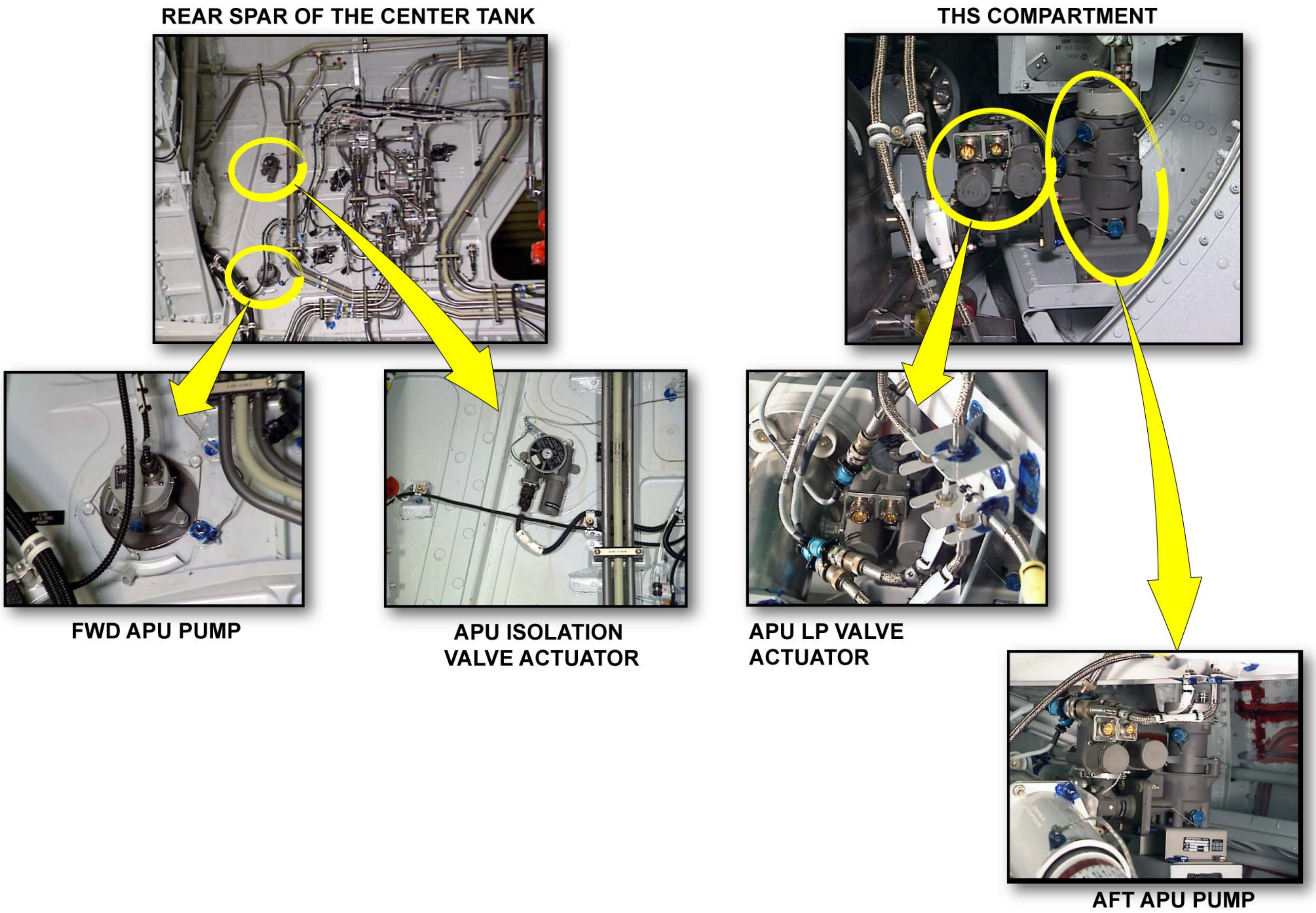
MANUAL MAGNETIC INDICATOR



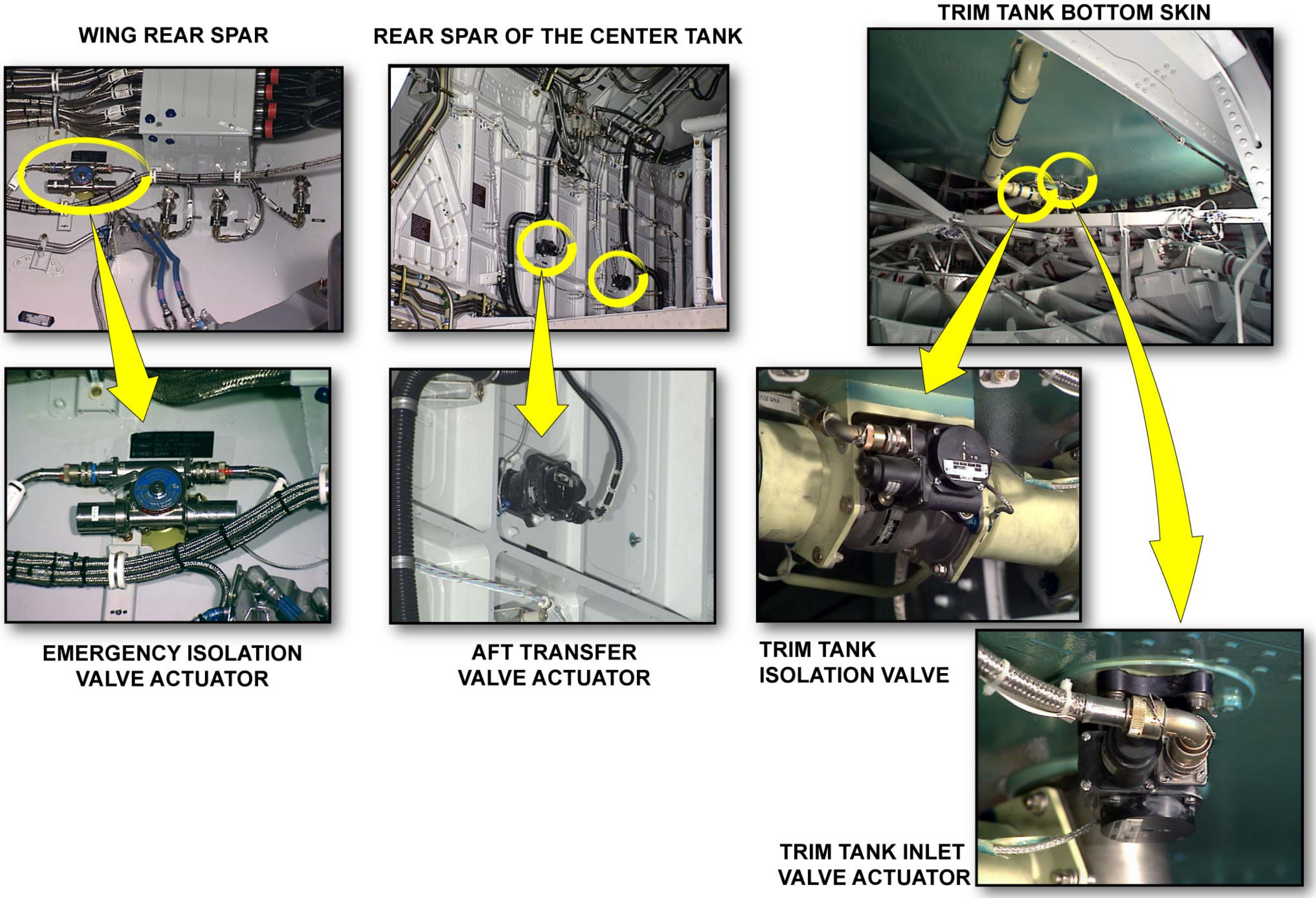
COMPONENT LOCATION



COMPONENT LOCATION



COMPONENT LOCATION



COMPONENT LOCATION

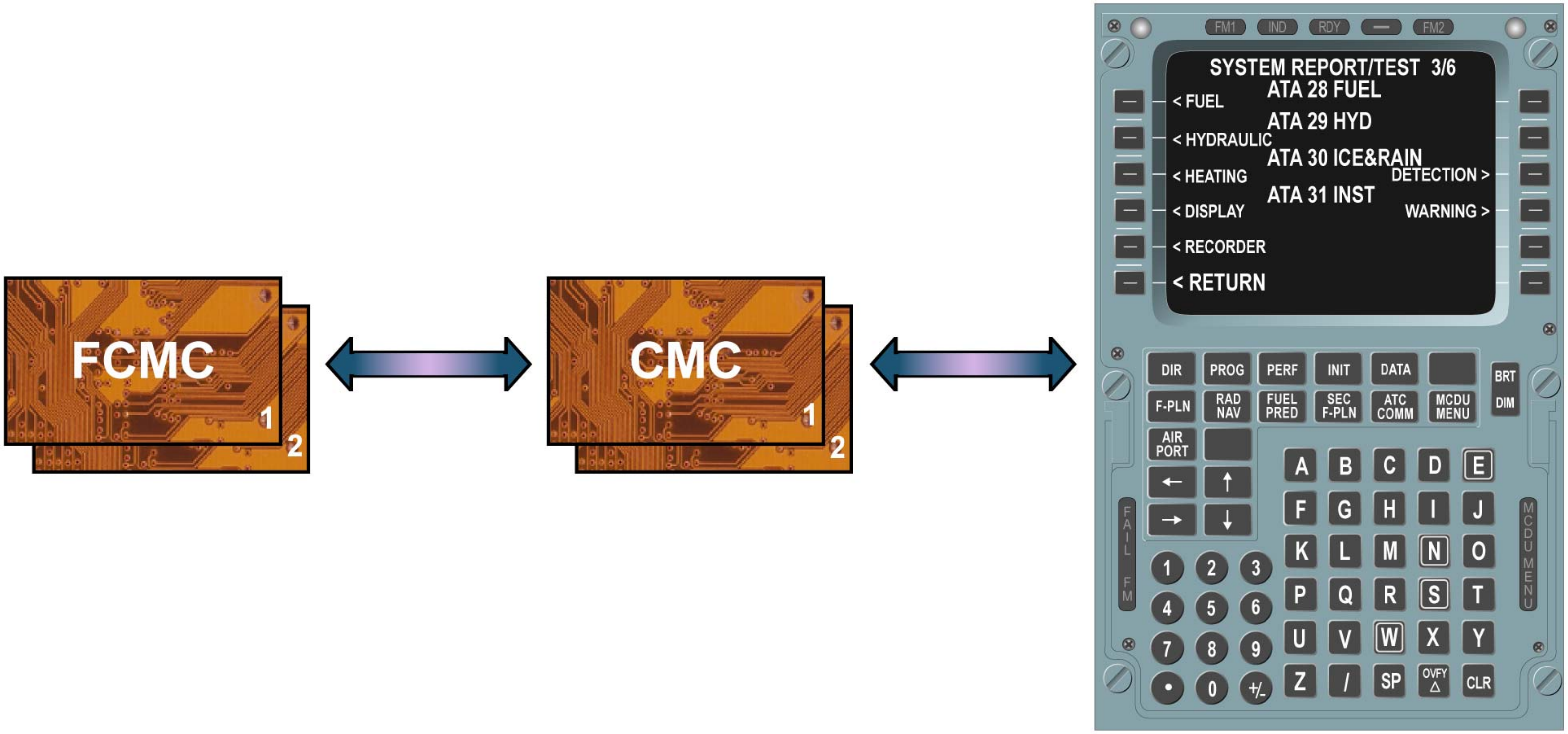
G6B08031 - G10T4T0 - FM28P8000000003

This Page Intentionally Left Blank

28 FUEL SYSTEM PRESENTATION (A330-200) (1)

MAINTENANCE / TEST FACILITIES

Each FCMC has a BITE. The BITE continuously monitors the FCMCs and fuel system components for failures. It is connected to the Centralized Maintenance Computers (CMCs) and can be interrogated from the MCDU for fuel data reports or test function.



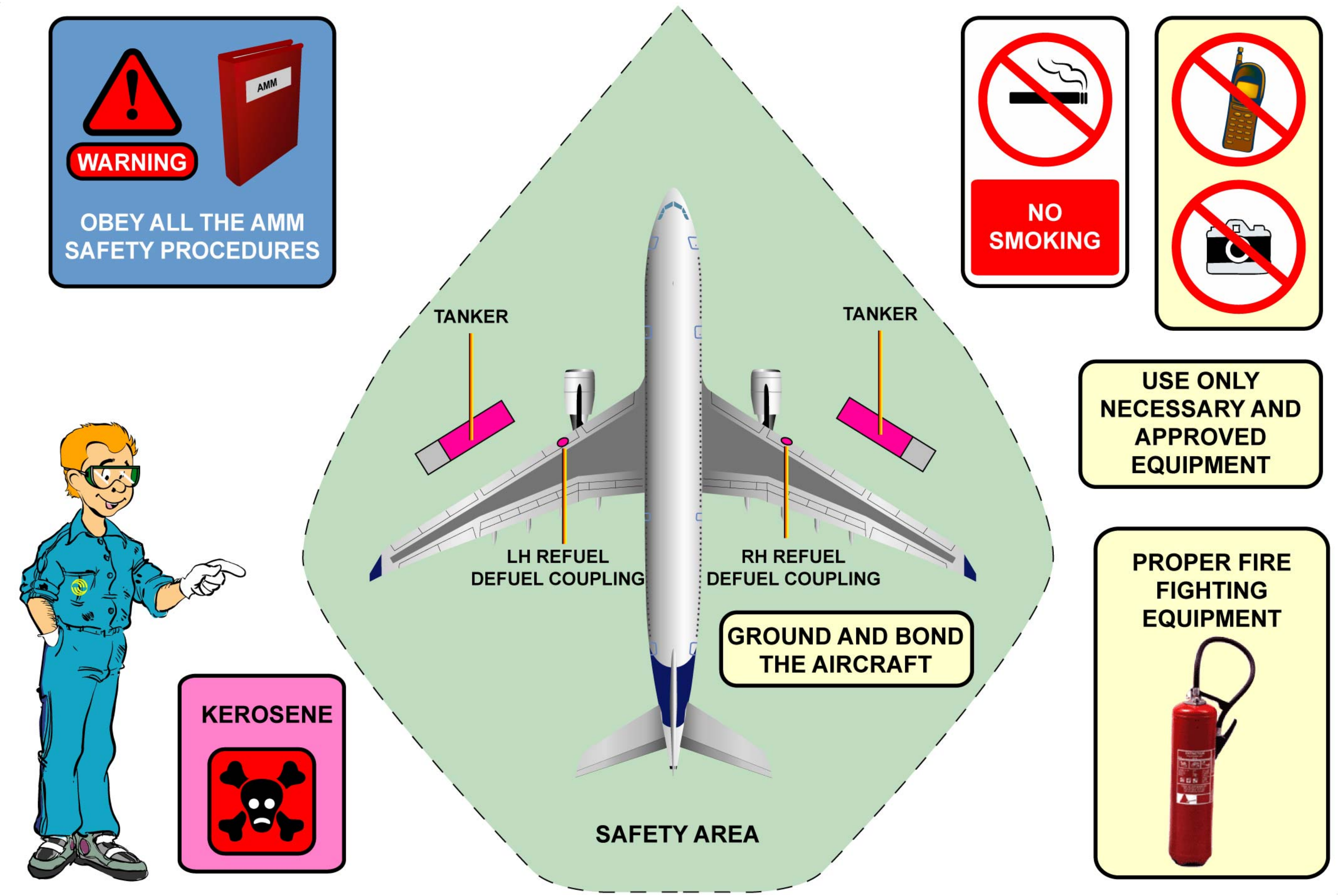
FCMC: Fuel Control Management Computer
CMC: Central Maintenance Computer

MAINTENANCE / TEST FACILITIES

28 FUEL SYSTEM PRESENTATION (A330-200) (1)

SAFETY PRECAUTIONS

When you work on A/C, make sure that you obey all the AMM safety procedures. This will prevent injury to persons and/or damage to the A/C.
Here is an overview of the main safety precautions relative to the fuel system. Kerosene is poisonous. Do not splash A/C fuel in your eyes, mouth, nose, and ears or on your skin. Use the approved protective clothing to prevent personal contamination and formation of static electricity. Make sure that you have the proper fire fighting equipment available. Make sure that the safety area is clear and clean. Respect the safety precautions within the safety distances. Put the NO SMOKING warning notices around the work area. Ground and bond the A/C.
In the Work area:
- do not use flames which do not have protection and do not use any material/tool which may cause sparks,
- use only necessary and approved electrical/electronic equipment,
- make sure that the air flow is sufficient to work safely, otherwise use a respirator,
- do not pull or move metal objects along the ground,
- immediately flush away or remove any fuel leakage.



SAFETY PRECAUTIONS

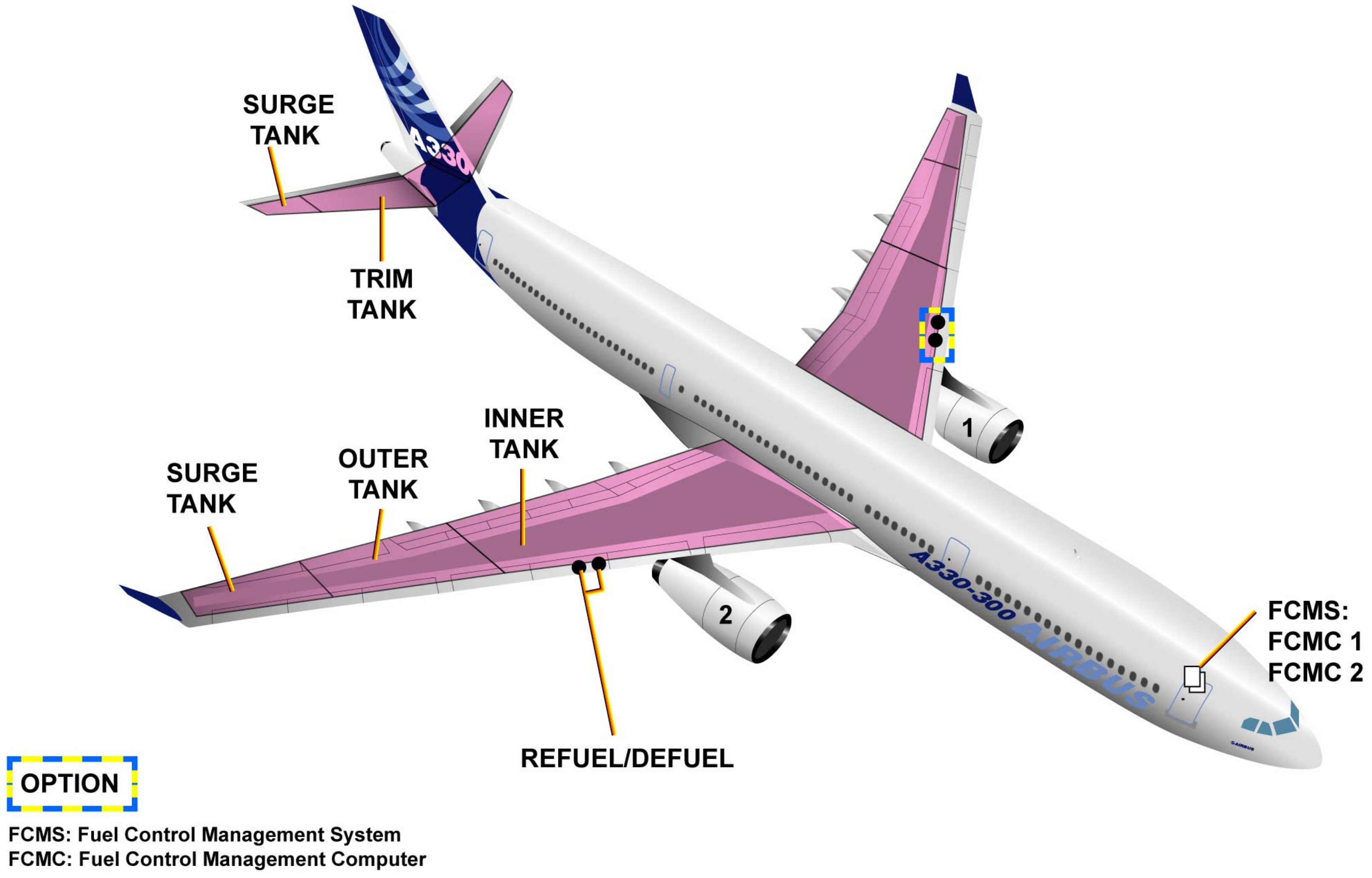
G6B08031 - G10T4T0 - FM28P8000000003

28 FUEL SYSTEM PRESENTATION (A330-300) (1)

GENERAL

The fuel system has different functions, which are:
- storage, venting and scavenge,
- engine feed,
- APU feed,
- main and trim transfers,
- refuel/defuel,
- and the maintenance/test facilities.

When you work on A/C, you must obey all the safety procedures listed in the AMM.



GENERAL

G6B08031 - G10T4T0 - FM28P8000000004

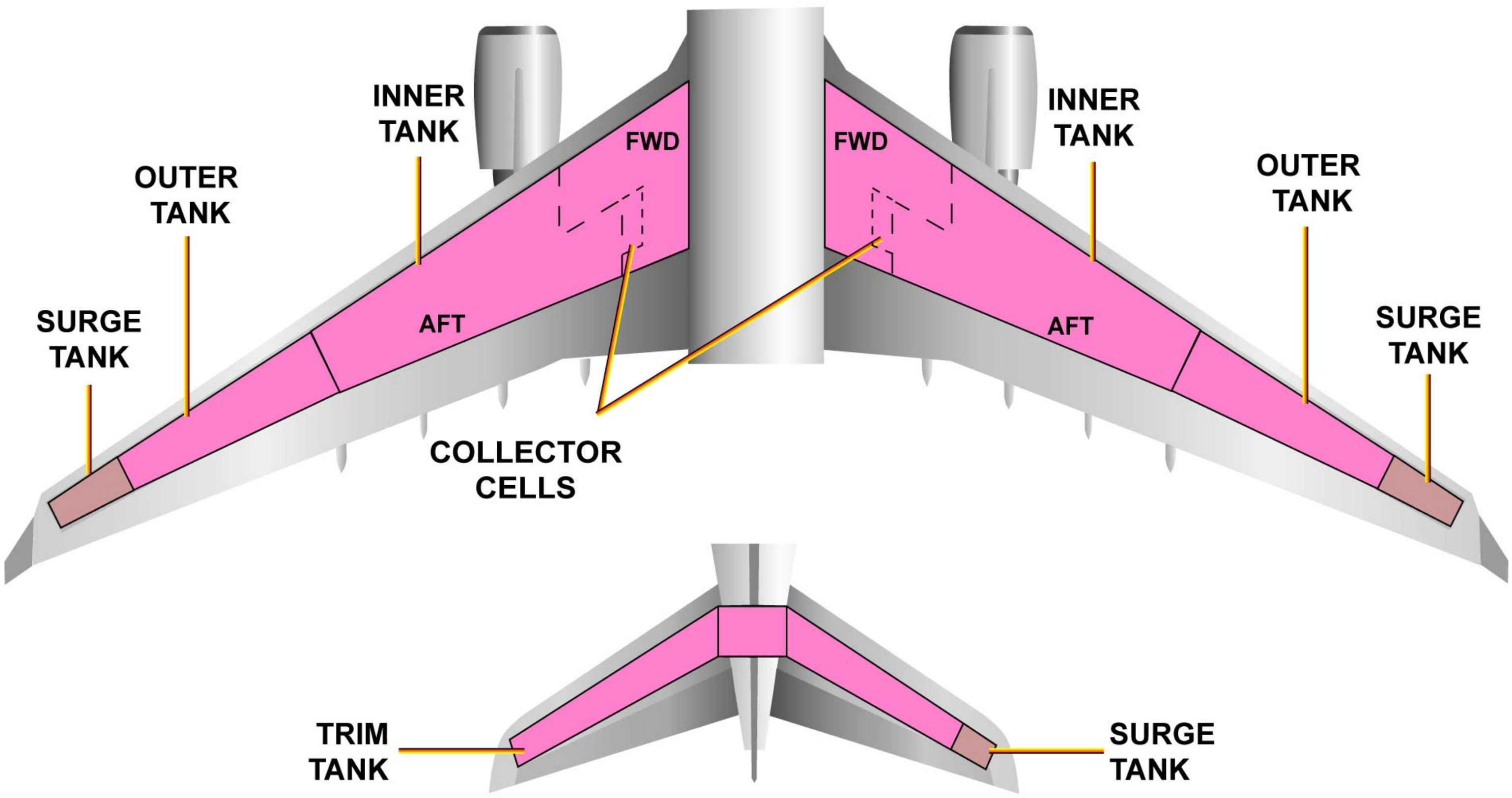
28 FUEL SYSTEM PRESENTATION (A330-300) (1)

STORAGE

The fuel is stored in five tanks. In each wing, there are an outer, and an inner tanks divided into two parts: the forward inner tank, and the aft inner tank. There also is a trim tank. Each inner tank section has one closed area called the collector cell, which is a reservoir for the booster pumps. A dedicated jet pump is only used to fill the collector cell of the main booster pumps. A vent surge tank is installed outboard of each outer tank in the wing and on the RH side of the trim tank. They vent the fuel tanks and collect fuel split from the tanks. Each tank has one or more water drain valves located at low points.
Two Fuel Control and Monitoring Computers (FCMCs) receive inputs from the different probes and sensors installed in the fuel tanks. The FCMCs transmit data to the ECAM and to the Refuel/Defuel panel. Each FCMC does the data monitoring and the calculation simultaneously, however one computer at a time achieves the control function (FCMC 1 in normal condition).
Two high level sensors are installed in each tank. When high level is sensed, the FCMC closes the related tank inlet valve. Low Level sensors are installed in each tank except in the outer tanks. They are used to control fuel operations and to trigger low-level warnings. One overflow sensor is installed in each surge tank. If an overflow is sensed, the FCMC closes all inlet valves and the refuel isolation valve.
In each fuel tank, the fuel quantities are measured from Fuel Quantity Indication (FQI) probes, compensators and densitometers. Temperature sensors are installed in each tank for fuel temperature monitoring and ECAM display.

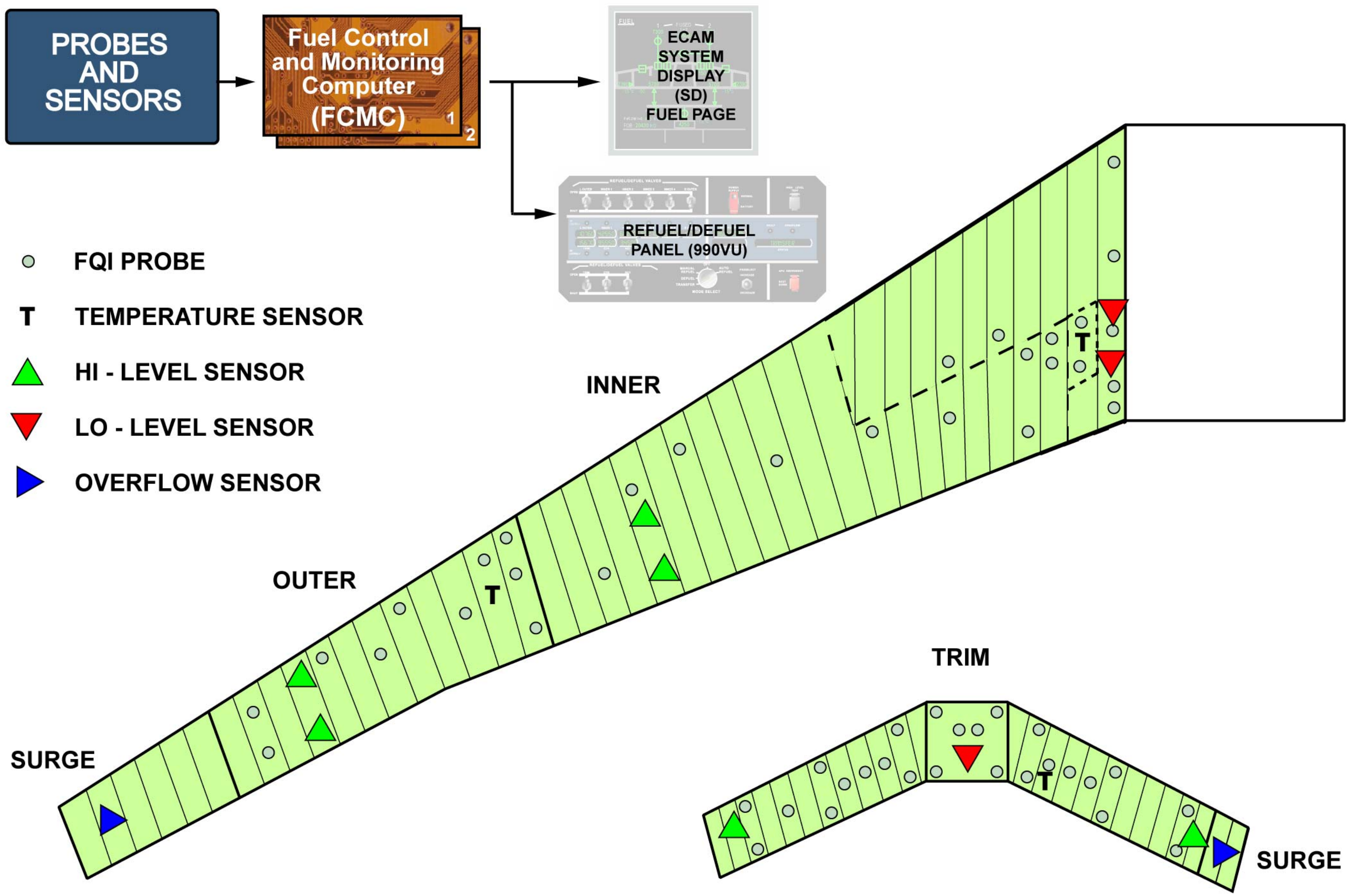
FUEL TANK	L/R OUTER	L/R INNER	TRIM	TOTAL
WEIGHT (Kg) *	2845	32895	4891	76369
WEIGHT (Lb) *	6272	72520	10782	168364

* FUEL SPECIFIC GRAVITY: 0.785 KG/L OR 6.551 LBS/US GAL

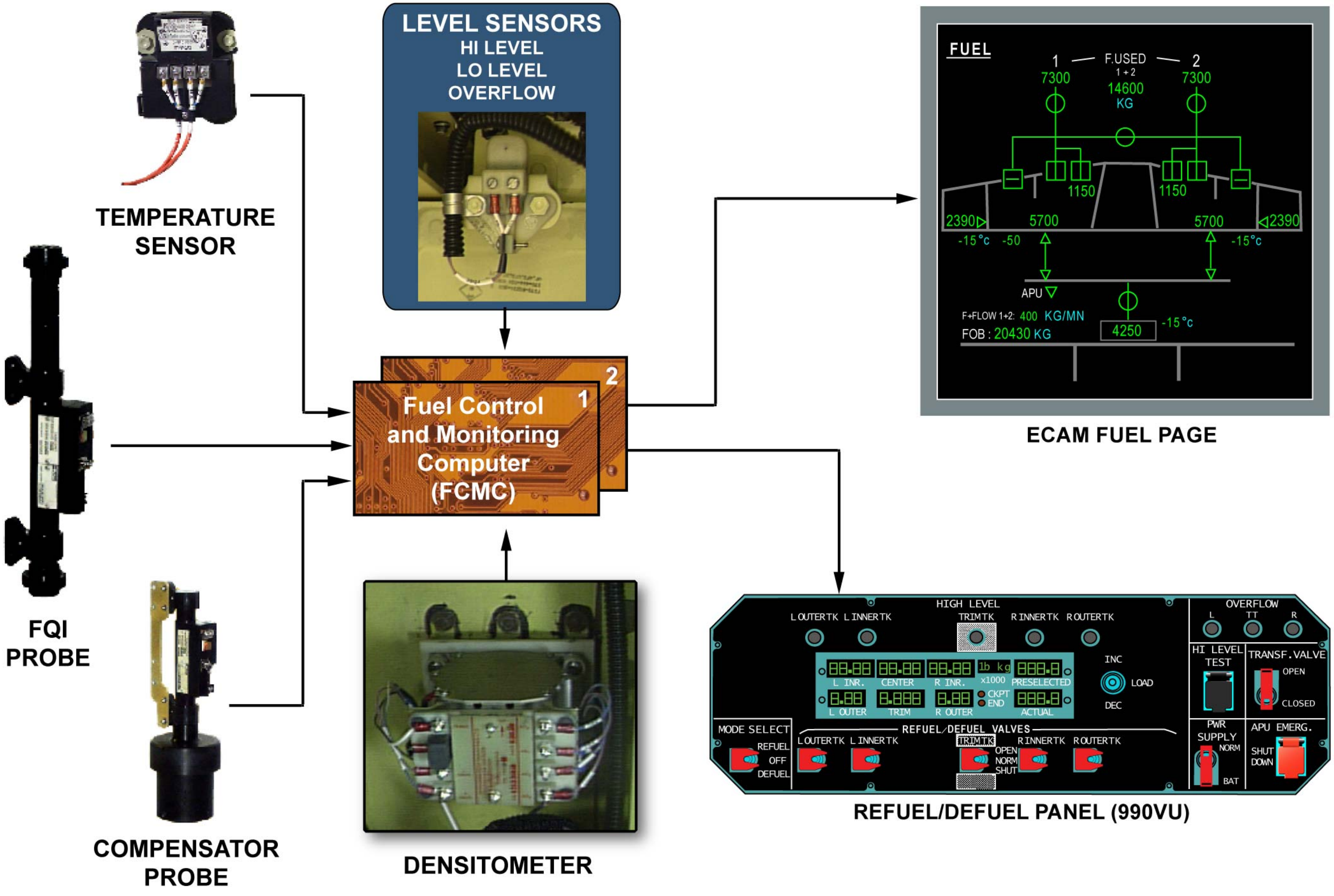


STORAGE

G6B08031 - G10T4T0 - FM28P8000000004


PROBES AND SENSORS
Fuel Control and Monitoring Computer (FCMC)
1
2
ECAM SYSTEM DISPLAY (SD) FUEL PAGE
REFUEL/DEFUEL PANEL (990VU)
FQI PROBE
T TEMPERATURE SENSOR
HI - LEVEL SENSOR
LO - LEVEL SENSOR
OVERFLOW SENSOR
INNER
OUTER
SURGE
T
TRIM
SURGE

STORAGE



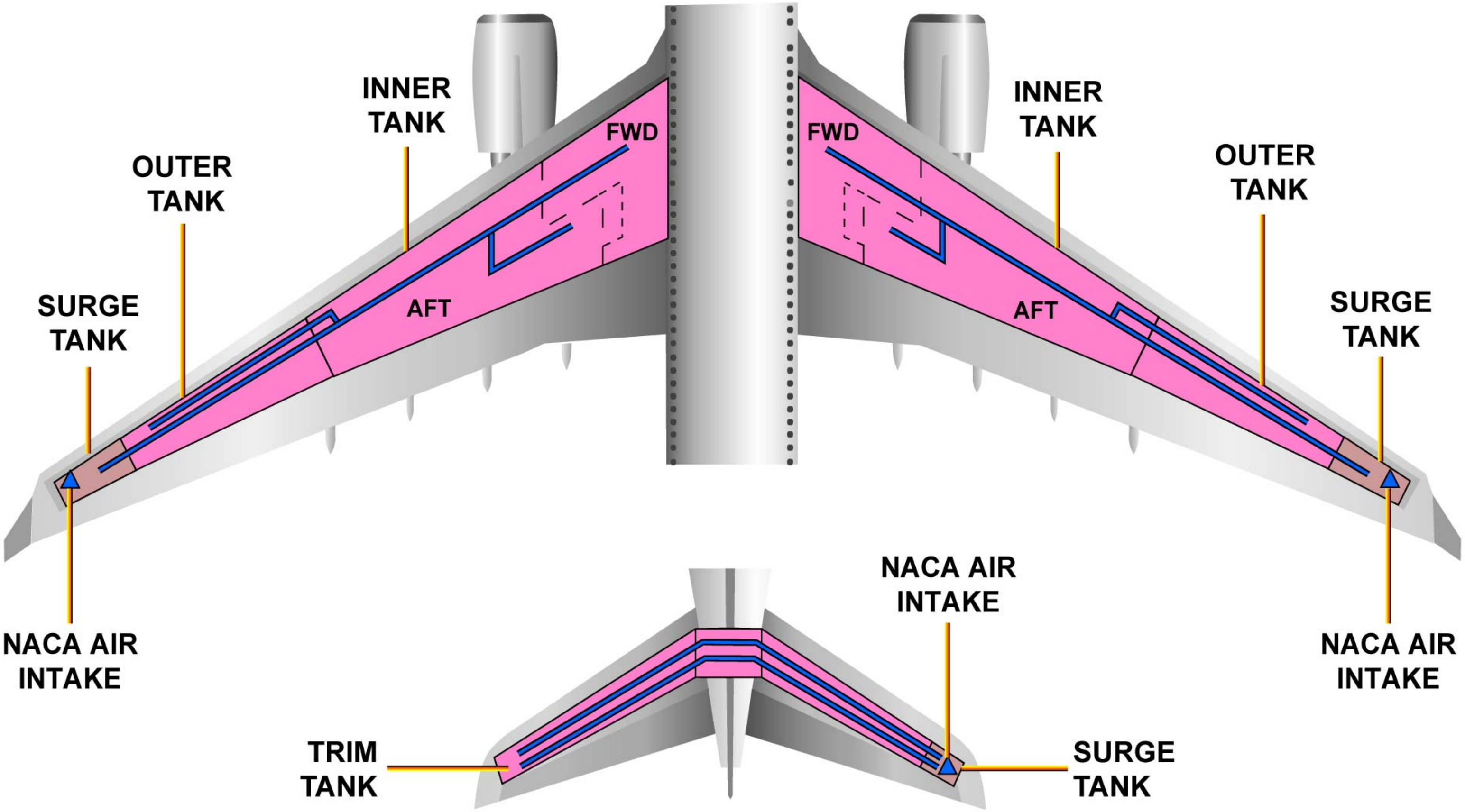
STORAGE

G6B08031 - G10T4T0 - FM28P8000000004

28 FUEL SYSTEM PRESENTATION (A330-300) (1)

TANK VENTING

Each wing tank and the trim tank are vented via dedicated vent pipes connected to their related vent surge tanks. A NACA air intake is mounted on an access panel on each vent surge tank.

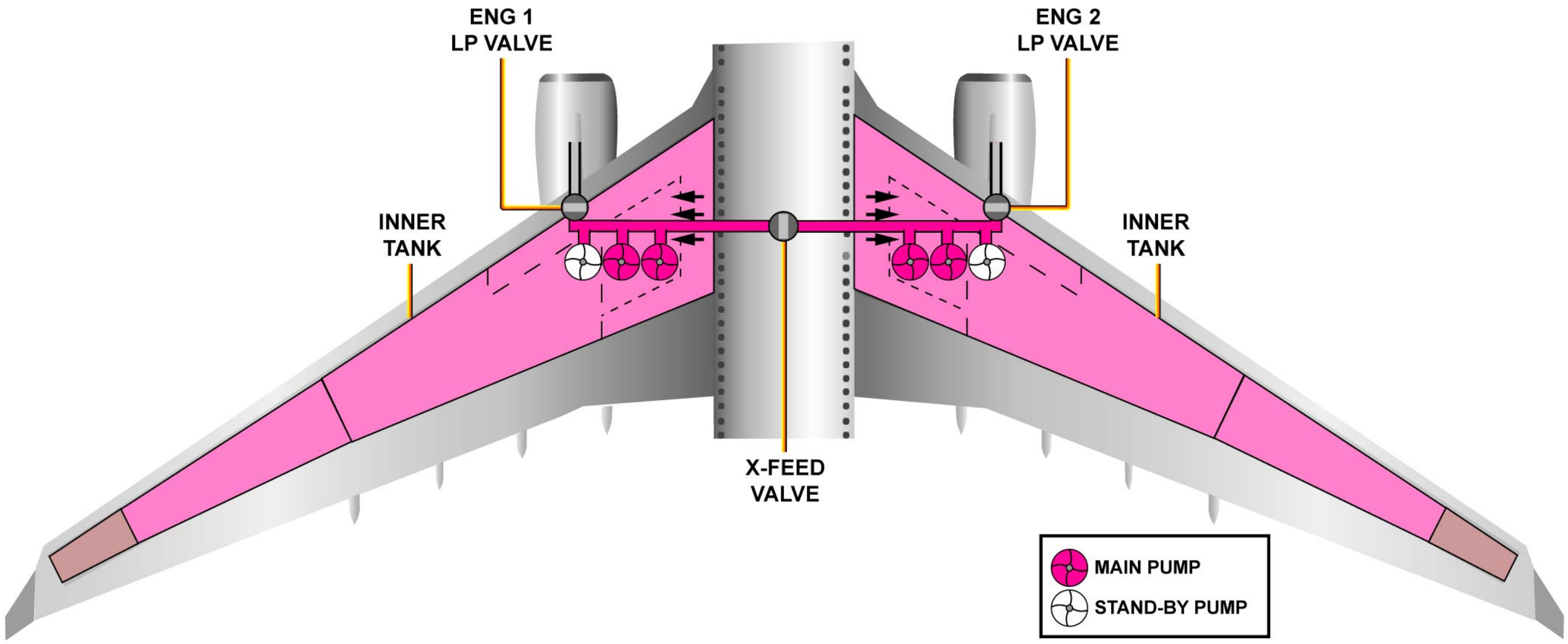


TANK VENTING

28 FUEL SYSTEM PRESENTATION (A330-300) (1)

ENGINE FEED

An independent fuel feed system supplies each engine. For each engine, there are two main fuel pumps, and one stand-by pump. In the normal configuration the main pumps are running and the stand-by pump is there as a back up when a main pump has a too low output pressure. A LP valve isolates its related engine from the fuel supply. The crossfeed system lets any engine be fed from any tank. It is used to correct fuel imbalance between tanks or during gravity feeding of the engines.



X-FEED: Cross-Feed

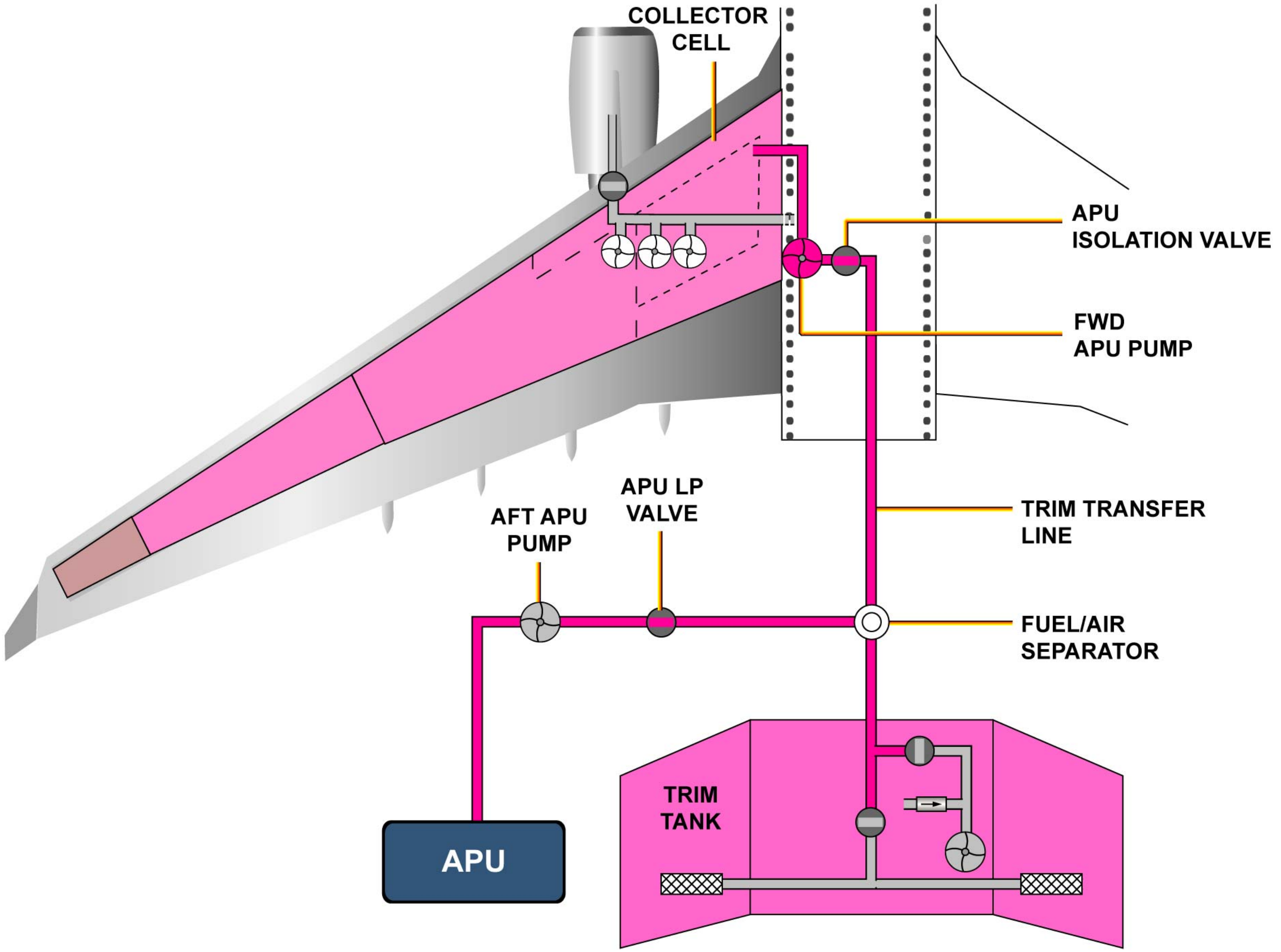
ENGINE FEED

G6B08031 - G10T4T0 - FM28P8000000004

28 FUEL SYSTEM PRESENTATION (A330-300) (1)

APU FEED SYSTEM

Fuel is supplied to the APU from the LH inner tank collector cell with the forward APU pump through the trim transfer line. If a low pressure is detected in the trim transfer line, the aft APU pump stars. The APU fuel isolation valve controls the fuel flow from the FWD inner tank to the trim transfer line. If an APU fire is detected, the APU LP valve closes. The Fuel/Air separator, installed in the trim tank fuel transfer line, keeps sufficient fuel for the APU operation if air enters the transfer line.

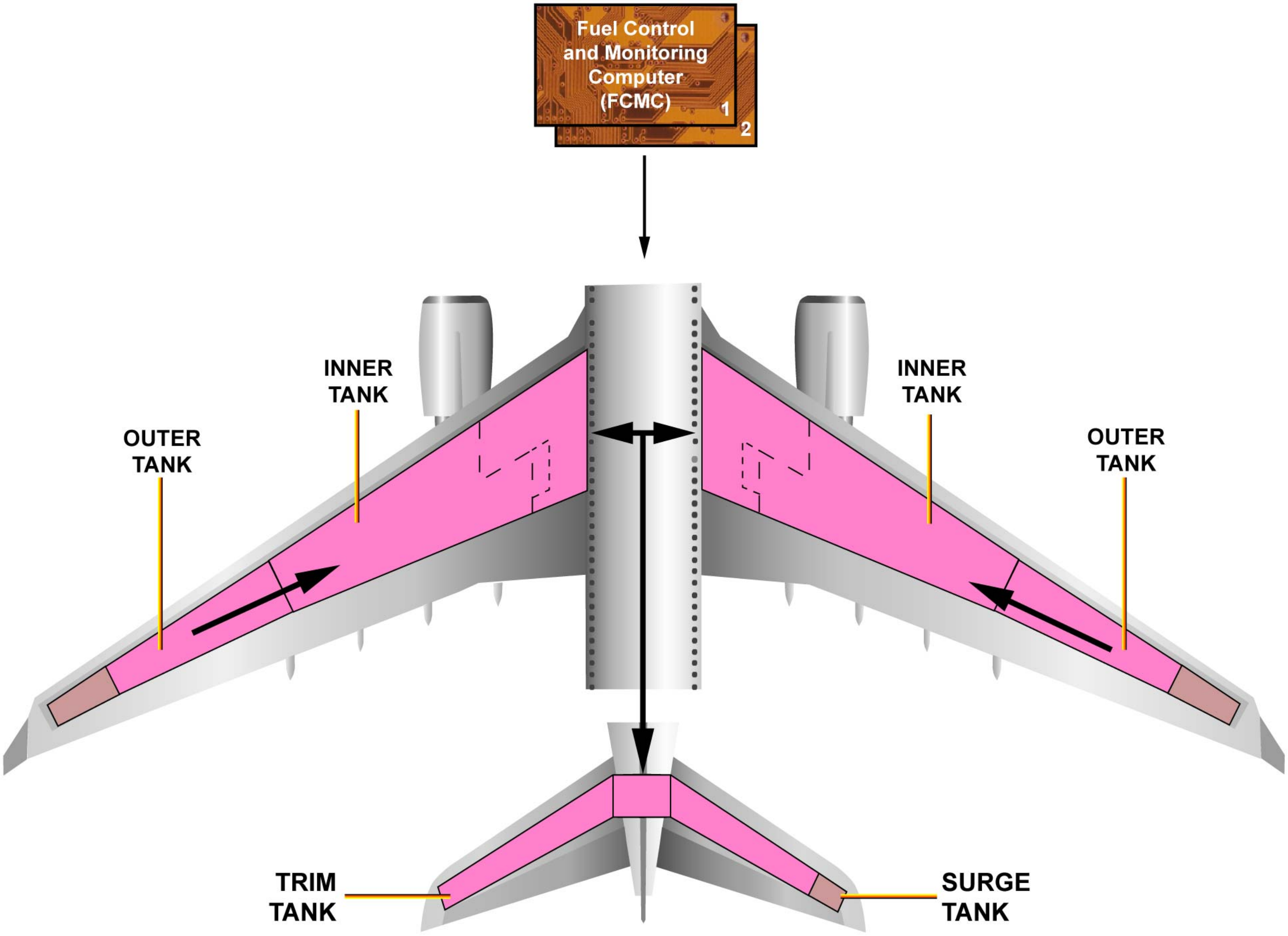


APU FEED SYSTEM

28 FUEL SYSTEM PRESENTATION (A330-300) (1)

MAIN AND TRIM TRANSFERS

The main transfer system controls the fuel flow from the outer tanks to the two inner tanks for engine feeding. The transfers are usually controlled automatically by the FCMCs, but they can be manually controlled if necessary. The trim transfer system controls the A/C center of gravity by forward and aft transfers. Trim transfers are controlled automatically by the FCMCs, but a manual forward transfer can be initiated from the fuel panel if a failure occurs.



MAIN AND TRIM TRANSFERS

28 FUEL SYSTEM PRESENTATION (A330-300) (1)

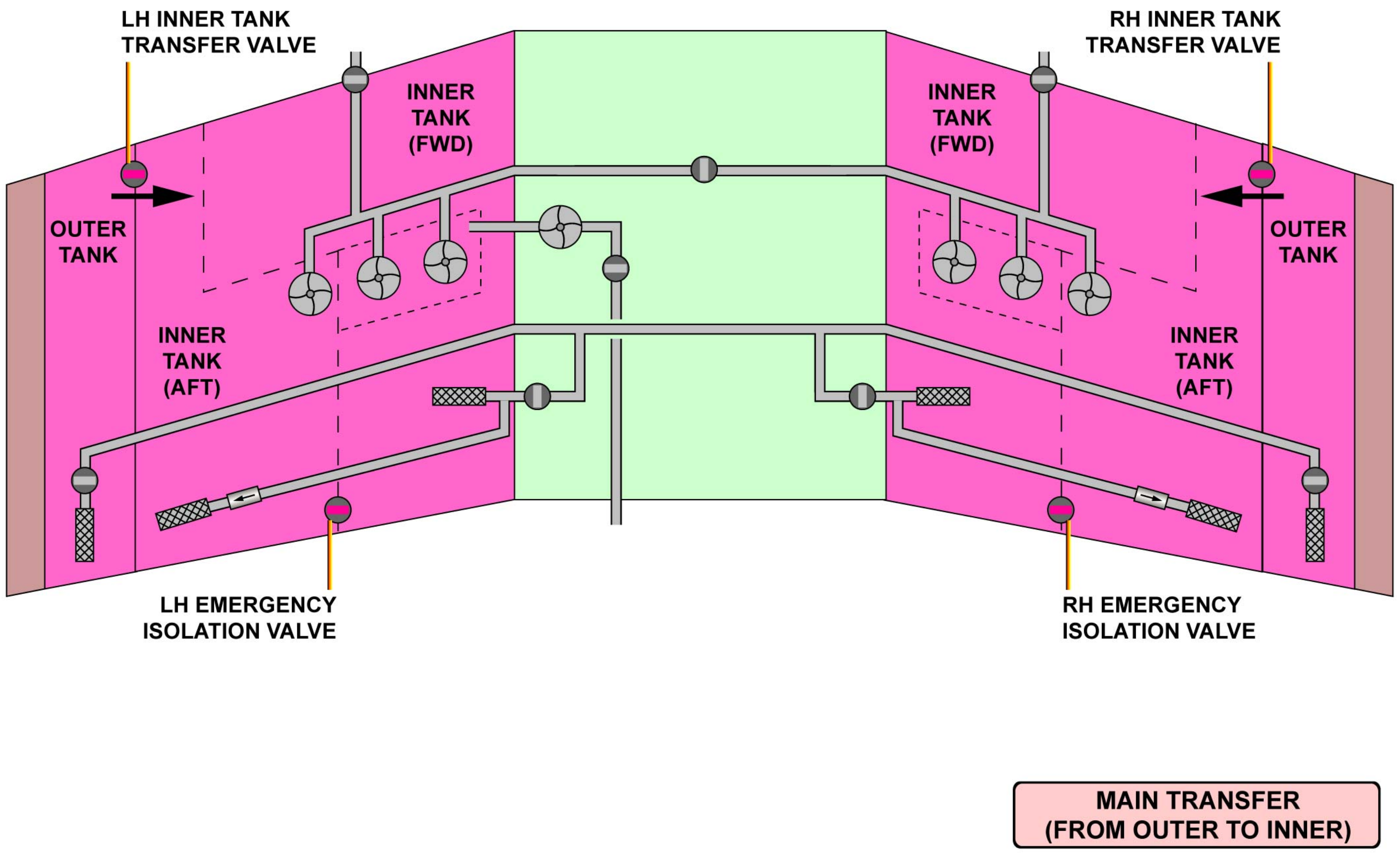
MAIN AND TRIM TRANSFERS (continued)

MAIN TRANSFERS FROM OUTER TANK TO INNER TANK

The outer tank to inner tank transfer is controlled automatically by the FCMC when the fuel quantity decreases in one inner tank to a low level. The crew can control them manually from the fuel panel. The system uses gravity to transfer the fuel from the outer tanks to the inner tanks.

The FCMC opens the valves when the inner tank fuel level is too low. The FCMC commands the LH and RH inter-tank transfer valves simultaneously in both wings to keep lateral balance.

Two emergency isolation valves control the fuel flow between the forward and aft inner tanks. The valves are installed between the aft and forward inner tanks. During normal operation the emergency isolation valves are open. The crew has to manually close the emergency isolation valves to isolate the forward inner tank from the aft inner tank in case of leak in either the forward or aft inner tank.



MAIN AND TRIM TRANSFERS - MAIN TRANSFERS FROM OUTER TANK TO INNER TANK

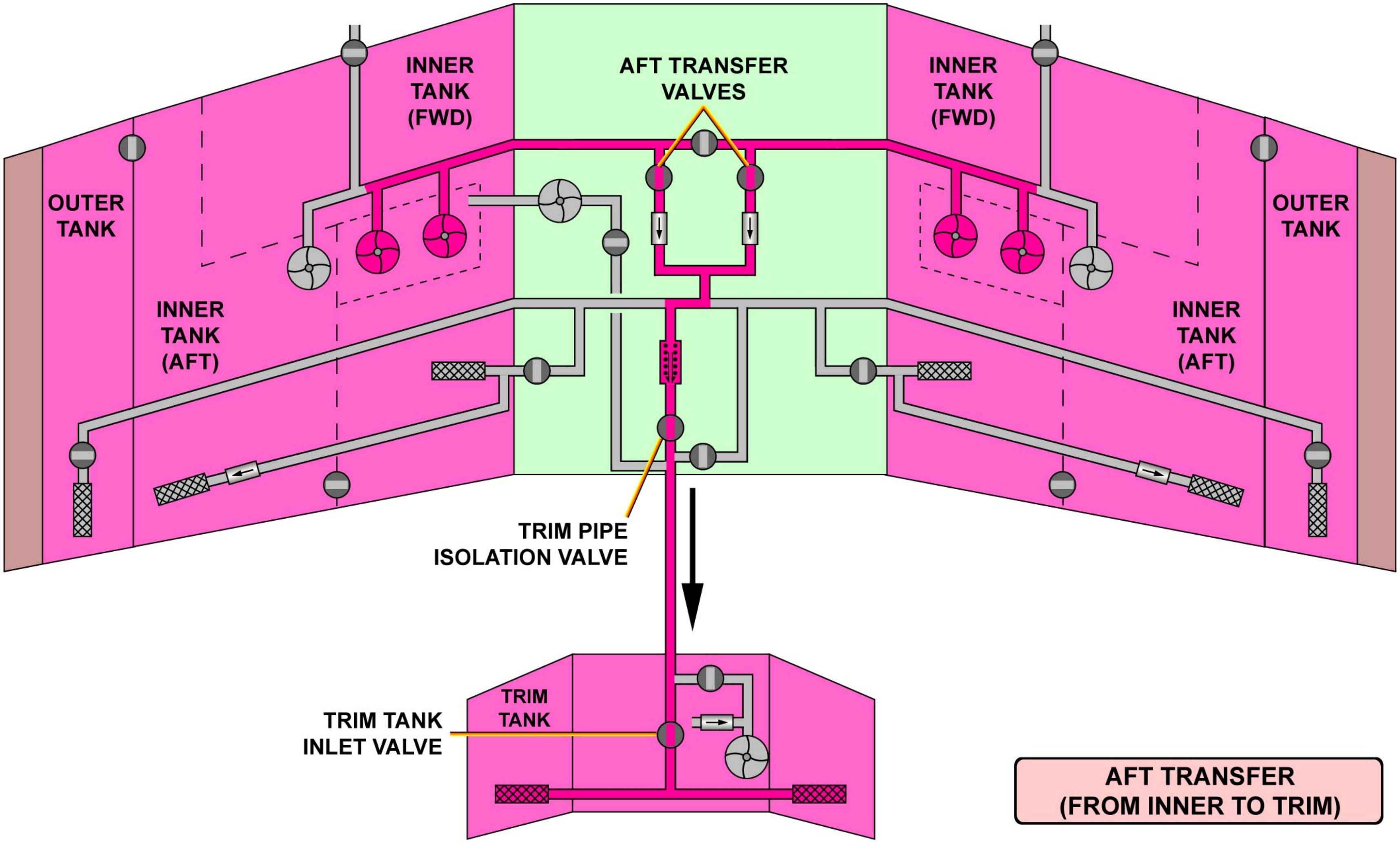
G6B08031 - G10T4T0 - FM28P8000000004

28 FUEL SYSTEM PRESENTATION (A330-300) (1)

MAIN AND TRIM TRANSFERS (continued)

AFT TRIM TRANSFERS

The trim transfer system controls the A/C CG position. For this function, the system moves fuel to the trim tank (this is the aft transfer), or from the trim tank (this is the forward transfer). When an aft transfer is required the booster pumps move fuel from the collector cells to the trim tank. The system operates automatically via the FCMC. However, the crew can manually set a forward transfer on the fuel panel.
The aft transfer uses the main pumps to fill the trim tanks. The system uses the aft transfer valves, the trim pipe isolation valve and the trim tank inlet valve. The fuel is pumped from the inner tanks.



MAIN AND TRIM TRANSFERS - AFT TRIM TRANSFERS

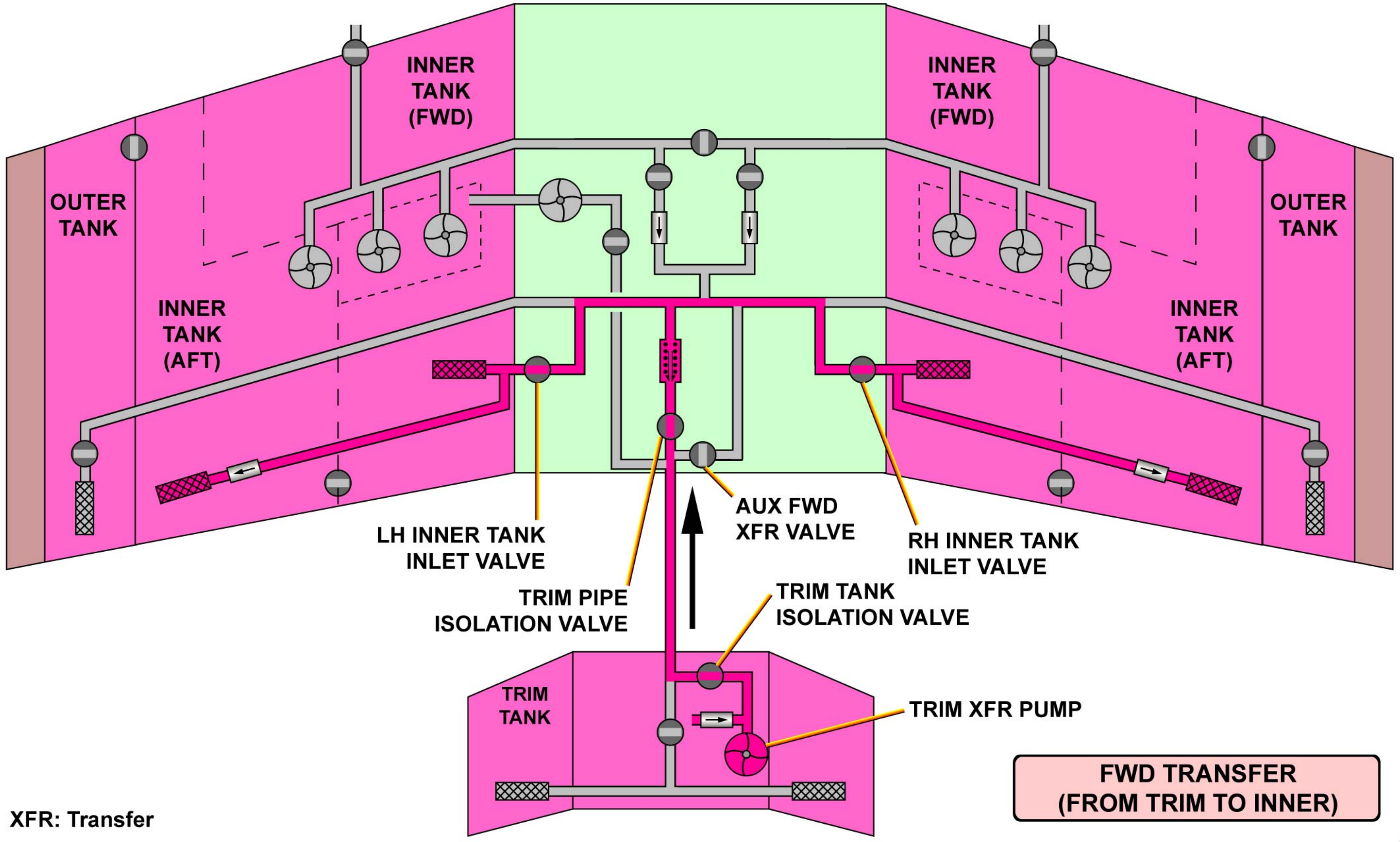
G6B08031 - G10T4T0 - FM28P8000000004

28 FUEL SYSTEM PRESENTATION (A330-300) (1)

MAIN AND TRIM TRANSFERS (continued)

FORWARD TRIM TRANSFERS

During an automatic forward transfer a trim transfer pump moves fuel from the trim tank to the inner tanks. The fuel can be transferred to the inner tanks by the trim transfer pump, through the trim tank isolation valve, the trim pipe isolation valve and the inner tank inlet valves. The FCMC opens the inner tank inlet valves. In manual mode, the AUXiliary FWD transfer valve is also controlled to open.



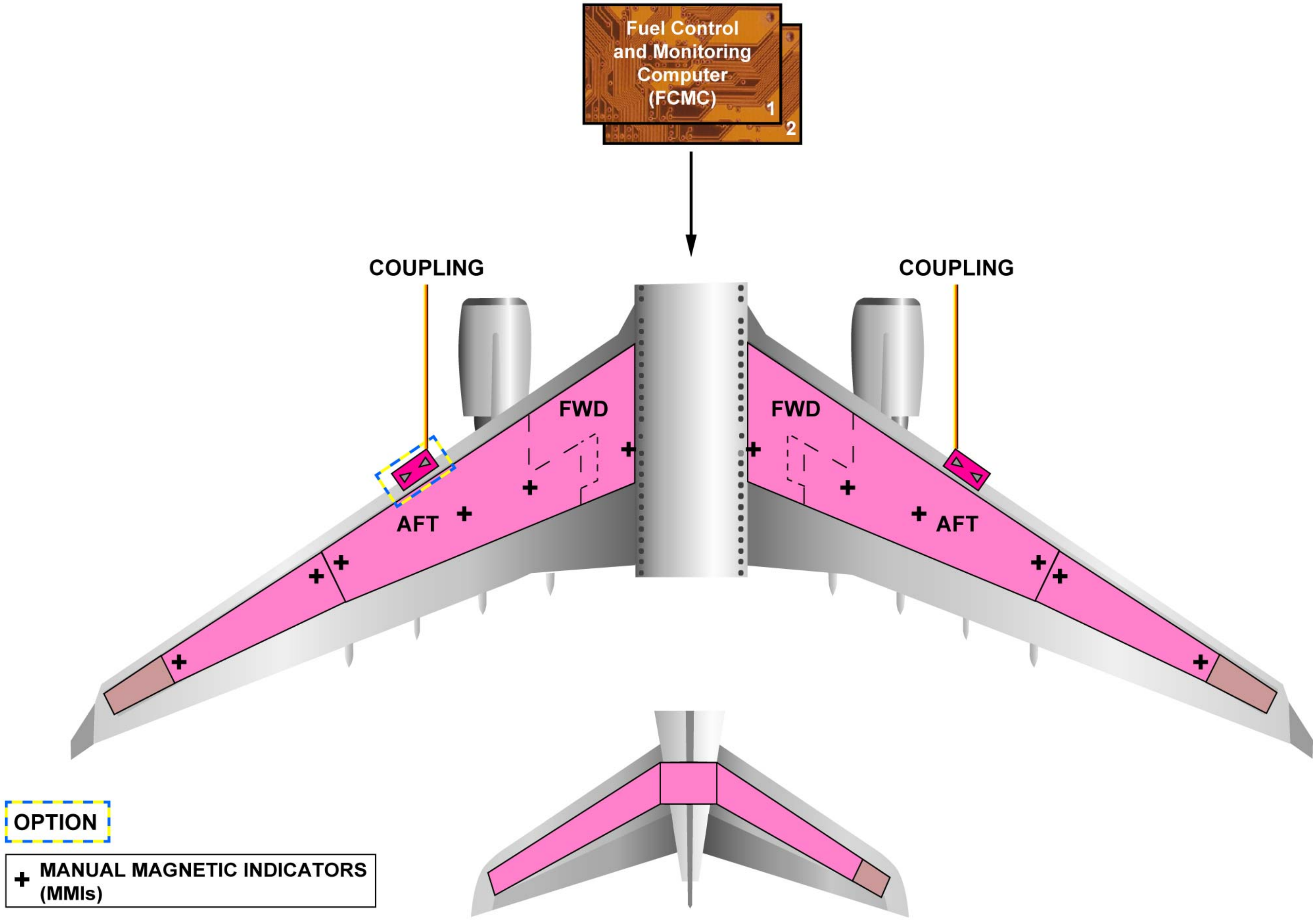
MAIN AND TRIM TRANSFERS - FORWARD TRIM TRANSFERS

G6B08031 - G10T4T0 - FM28P8000000004

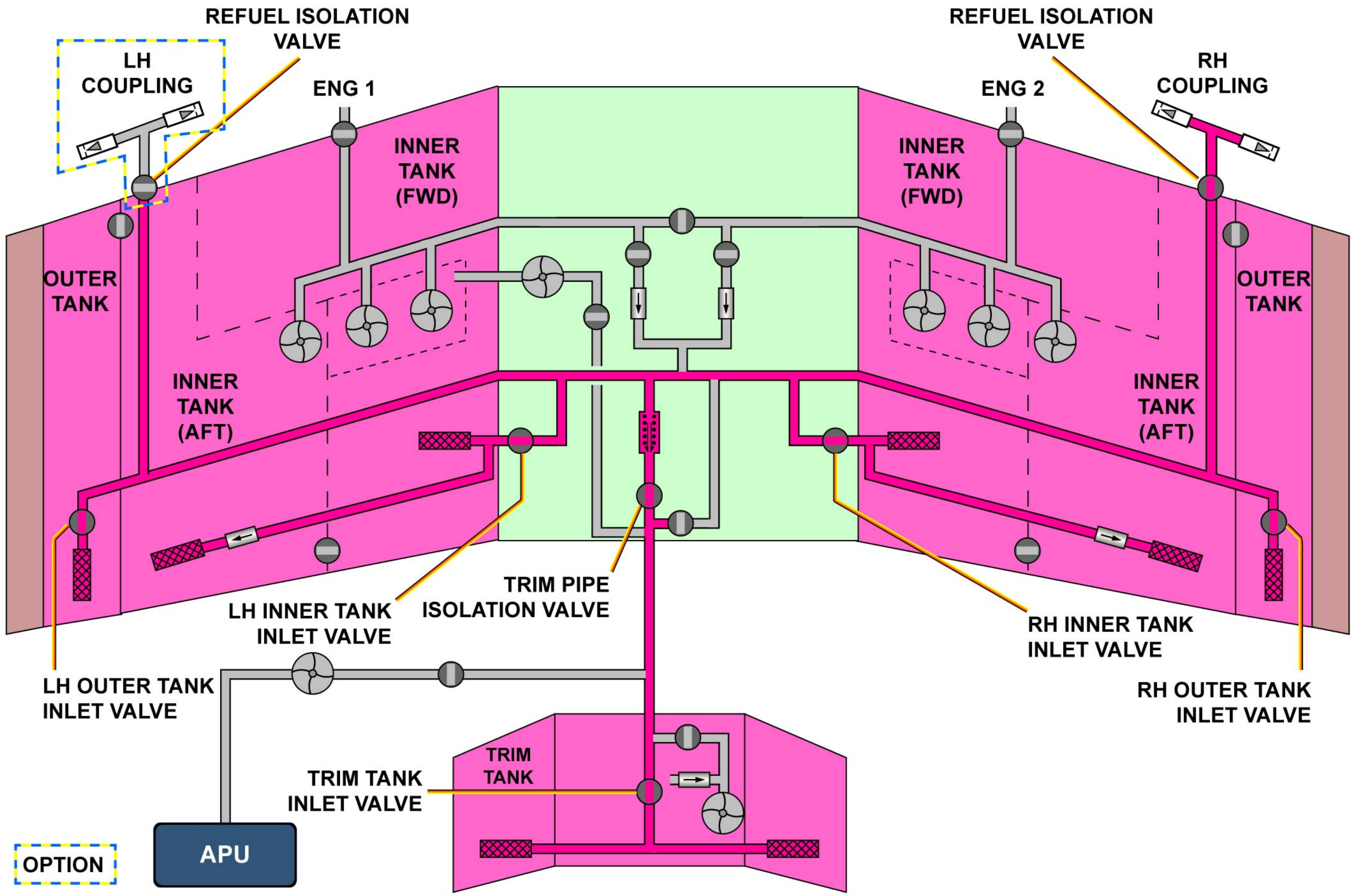
28 FUEL SYSTEM PRESENTATION (A330-300) (1)

REFUEL/DEFUEL

On ground, the A/C can be refueled automatically or manually, defueled with pressure or suction, and fuel can be transferred from tank to tank.
A refuel/defuel coupling is installed in the leading edge of the RH wing allowing aircraft refueling. Optionally, the refuel/defuel system can have an additional refuel/defuel coupling on the LH wing leading edge. The FCMCs control the refuel/defuel and transfer operations. In case of fuel quantity indication failure, the fuel quantities can be determined by using the tank Manual Magnetic Indicators (MMIs).
A refuel/defuel coupling installed in the leading edge of the RH wing is the interface between the Refuel/Defuel system and the external fuel source. The coupling has two adaptors allowing the aircraft to be refueled from two hoses at the same time. The refuel isolation valve controls the fuel supply from the refuel coupling to the refuel gallery. The outer tank inlet valve controls the flow of fuel into the outer tank. The inner tank inlet valve independently controls the flow of fuel from the refuel gallery to the inner tank. The fuel flows into the trim tank via the trim pipe isolation valve and the trim tank inlet valve. Fuel flows into each tank through diffusers.



REFUEL/DEFUEL



REFUEL/DEFUEL

This Page Intentionally Left Blank

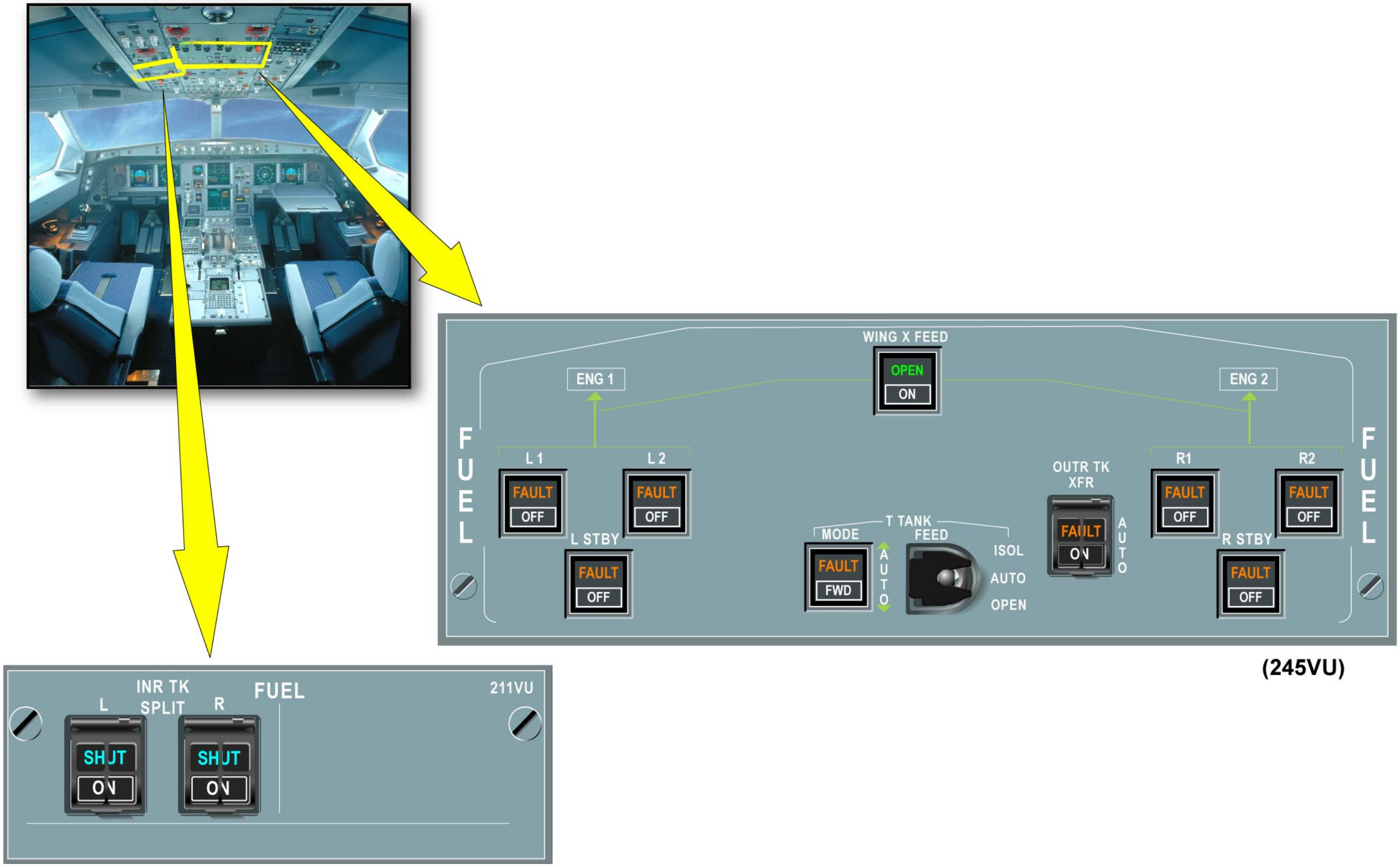
28 FUEL SYSTEM PRESENTATION (A330-300) (1)

CONTROL AND INDICATING

This section will highlight the control panels and indications for the fuel system.

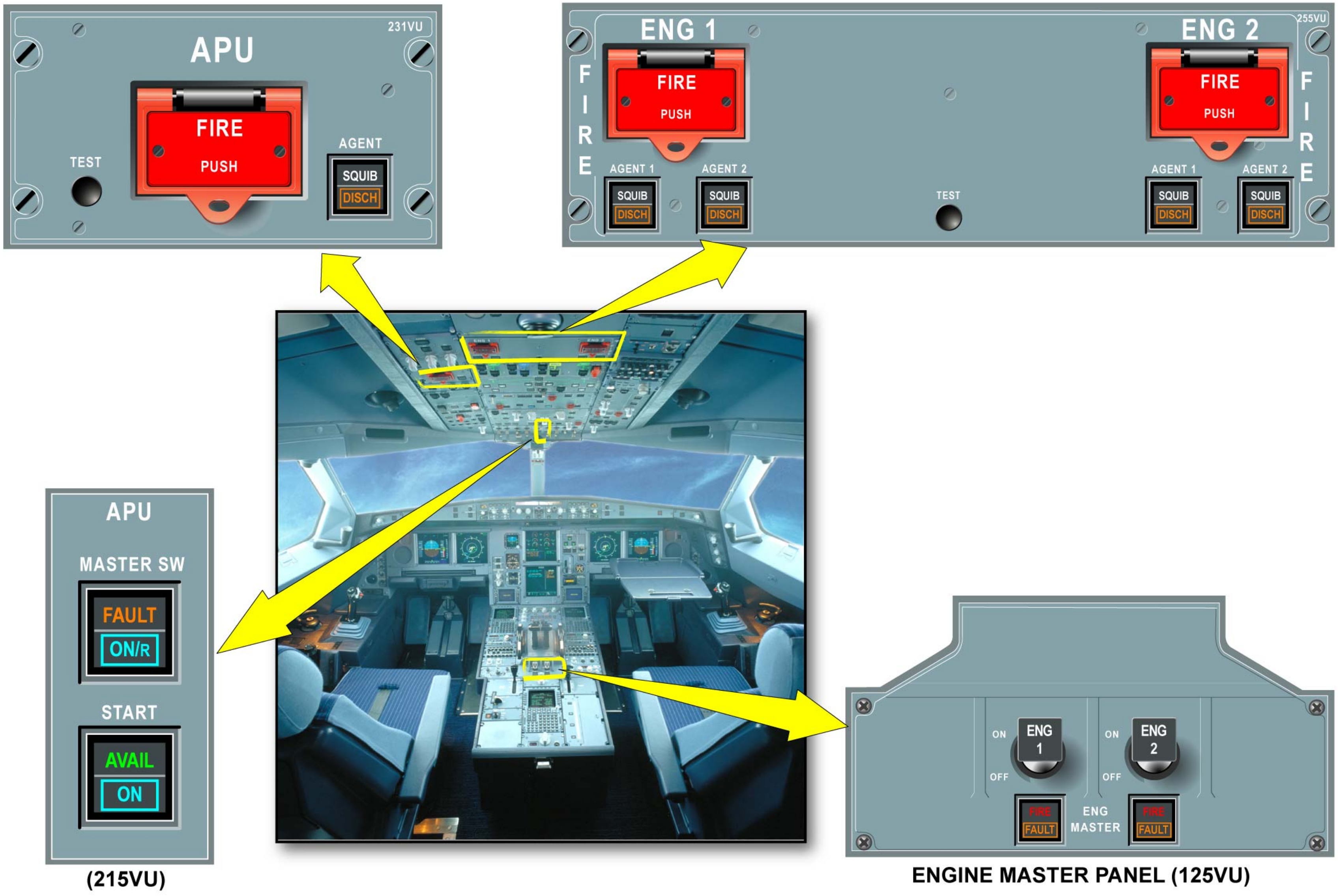
CONTROL PANELS

The FUEL control panel is located on the overhead panel. Each main and stand-by pump has its related control P/BSW for each related engine collector cell. The cross feed valves normally closed may be controlled open automatically in case of electrical emergency configuration or manually by their dedicated P/BSWs.
An action on the LH or RH INR TK SPLIT P/BSW located on the fuel emergency control panel is used for manual control of the emergency isolation valves. The OUTER TK XFR P/BSW on the fuel control panel, is used to manually or automatically control the outer tank fuel transfer to the inner tanks. The T TANK MODE P/BSW on the fuel control panel is used to manually or automatically control the Trim Tank transfer. The T TANK FEED control selector is used to ISOLAte, to OPEN, and to AUTOmatically control the Trim tank fuel transfer.
The LP valves are open or closed using their related ENG MASTER switch on the pedestal panel. In case of fire an action on the engine FIRE P/B on the overhead panel closes its related LP valve. The APU MASTER SW on the overhead panel controls the APU fuel supply. In case of APU fire, an action on the APU FIRE P/B on the overhead panel closes the APU LP valve.



G6B08031 - G10T4T0 - FM28P8000000004

CONTROL AND INDICATING - CONTROL PANELS



CONTROL AND INDICATING - CONTROL PANELS

This Page Intentionally Left Blank

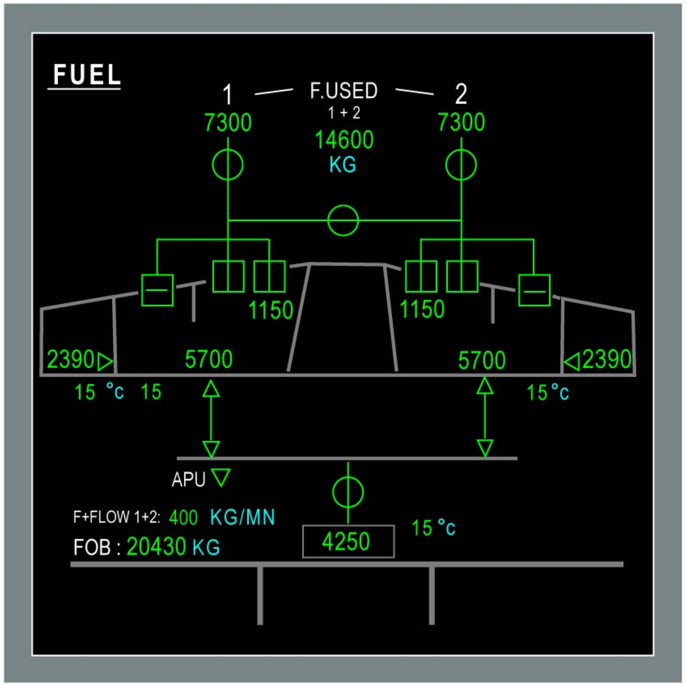
28 FUEL SYSTEM PRESENTATION (A330-300) (1)

CONTROL AND INDICATING (continued)

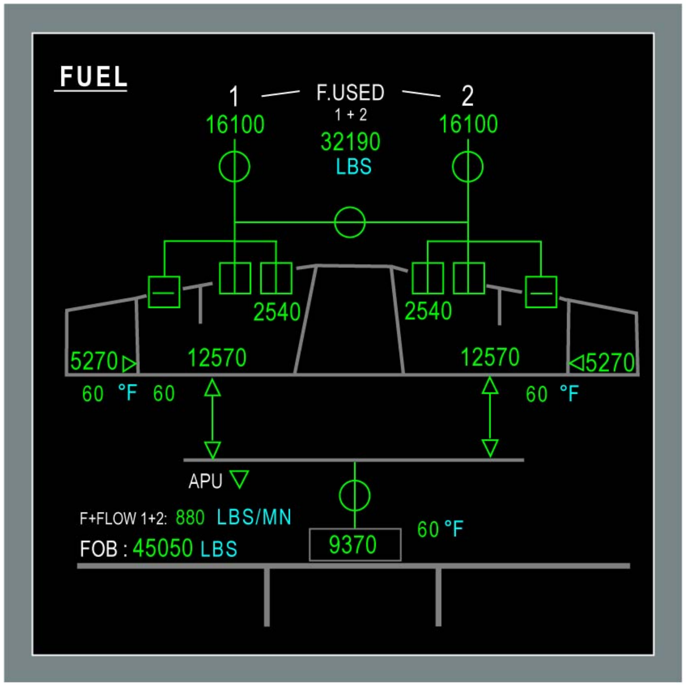
ECAM FUEL PAGE

The engine feed status and the APU feed status, transfer data status are displayed on the ECAM FUEL page.

The DUs show all indications available but not a system configuration.



FUEL ECAM PAGE
(METRIC)



FUEL ECAM PAGE
(US)

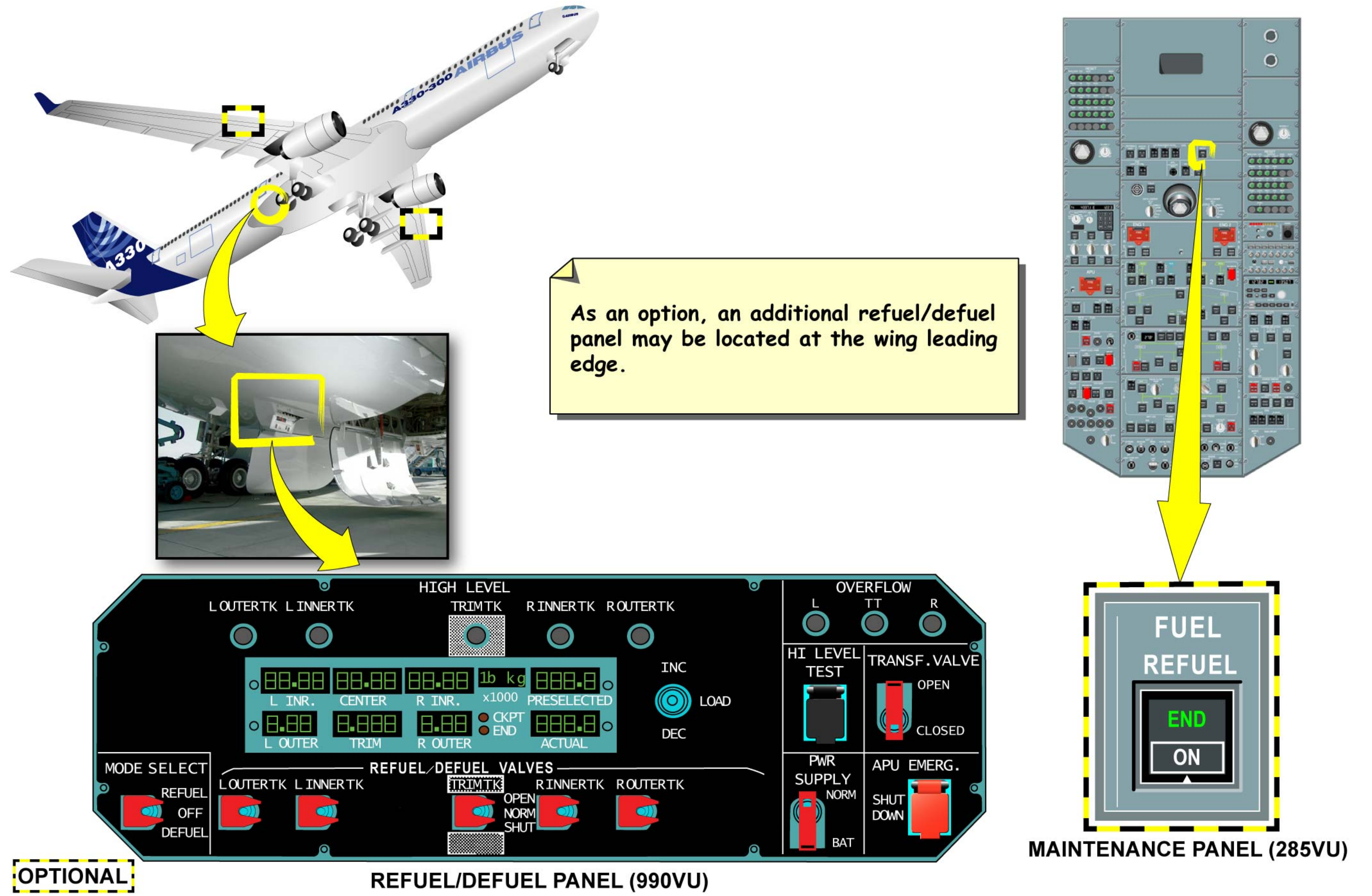
CONTROL AND INDICATING - ECAM FUEL PAGE

28 FUEL SYSTEM PRESENTATION (A330-300) (1)

CONTROL AND INDICATING (continued)

REFUEL/DEFUEL

On ground, the A/C can be refueled automatically or manually, defueled with pressure or suction. Fuel can be transferred from tank to tank. A refuel/defuel coupling is installed in the leading edge of the RH wing allowing refueling of the A/C. Refueling can be controlled and monitored from the refuel/defuel panel or optionally from the cockpit. The FCMCs control the refuel/defuel and transfer operations. The options for the refuel/defuel system is an additional coupling on the LH wing leading edge as well as additional refuel/defuel panels located at the LH or/and RHwing leading edges.

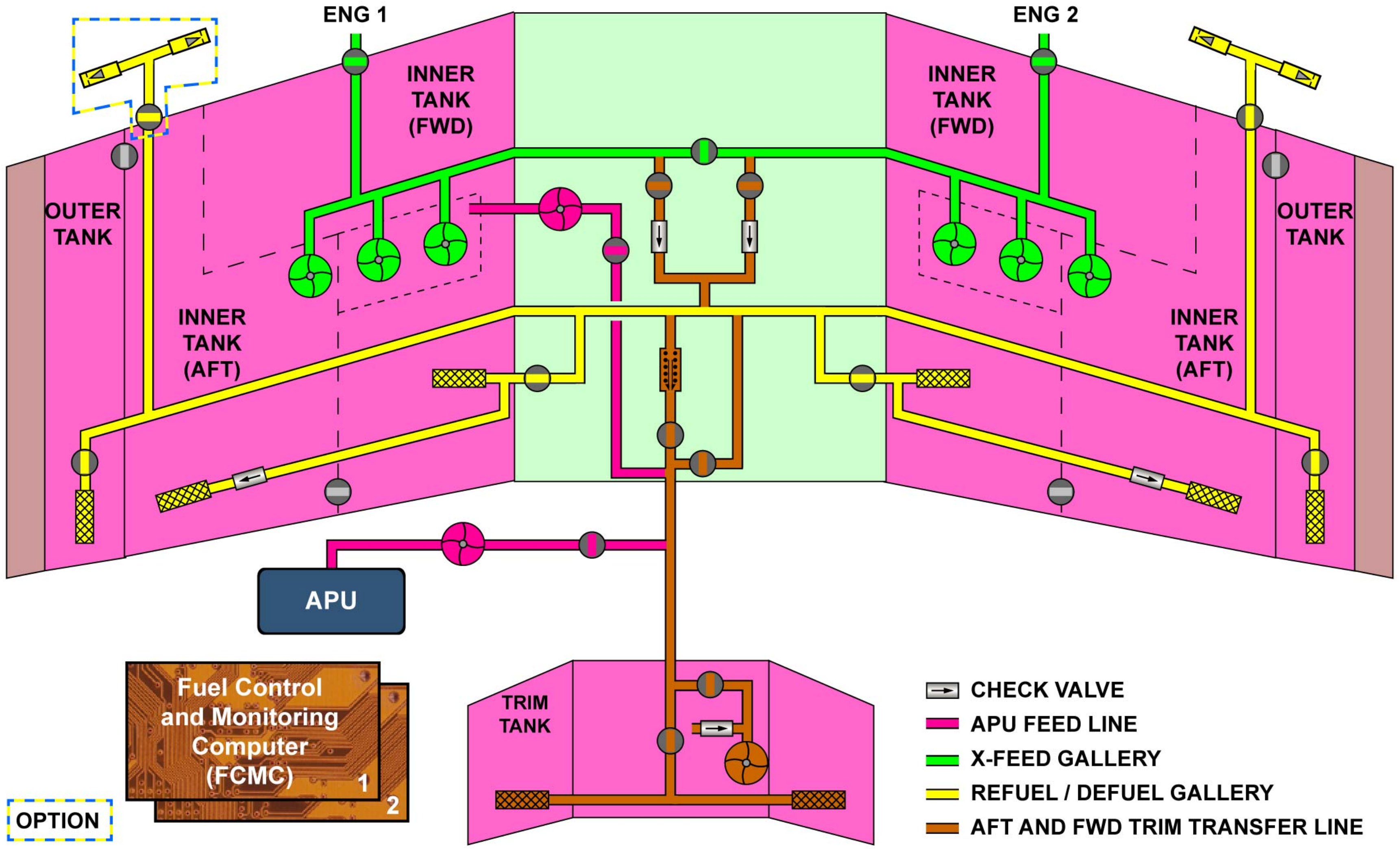


CONTROL AND INDICATING - REFUEL/DEFUEL

28 FUEL SYSTEM PRESENTATION (A330-300) (1)

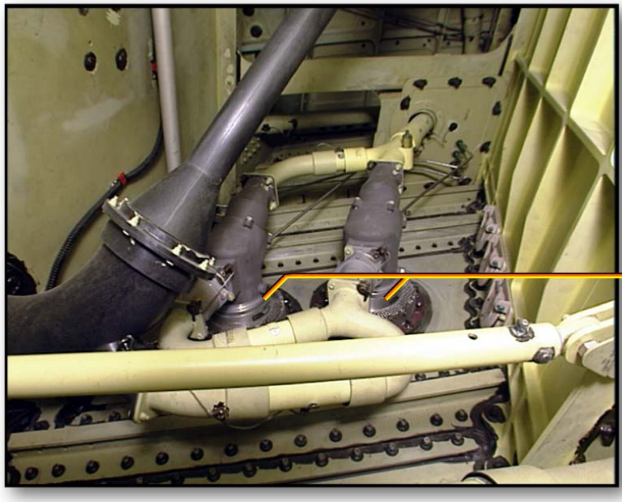
COMPONENT LOCATION

This is a global view of the fuel system.
The wing fuel feed pumps are replaced from the wing lower surface by removing the wing pump access fairing. The fuel pump canister can replace the fuel pump element when there is fuel in the collector cell.
The water drain valve let you remove water, which could collect in quantities sufficient to cause malfunction to the engine.
The RH refuel/defuel coupling is located beneath the RH wing leading edge. There is one refuel isolation valve on the coupling. The refuel isolation valve has a Manual Button. When pressed, the manual button holds the valve open, with the fuel pressure coming from the fuel tanker event, with a lack of electrical failure. The Manual Magnetic level Indicators (MMIs) are used to calculate the tank fuel quantities without electrical power on the aircraft.
The X-feed valve actuator is installed on the center tank rear spar. It controls the flow of fuel between Engine 1 and 2 feed lines.
The inner tank inlet valves actuators are installed on the center tank rear spar. They independently control the flow of fuel coming from the refuel gallery to the inner tanks.
The FWD APU pump, APU isolation valve actuator and Trim pipe isolation valve actuators are installed at the rear spar of the wing center tank. The AFT APU pump and APU LP valve are located in the tail cone section.
The TT inlet valve actuator is attached to the bottom skin of the TT, it controls the flow of fuel into the trim tank.
The trim-tank isolation valve is installed on the trim transfer line below the trim tank at Trimmable Horizontal Stabilizer RH. The actuator is attached to the valve.
The aft transfer valves actuators are installed at the rear face of the wing rear spar, they control the supply of fuel from the engine feed line to the refuel gallery.
The emergency isolation valves actuators are installed below the center tank, they control the flow of fuel between the AFT and the FWD inner tanks.



COMPONENT LOCATION

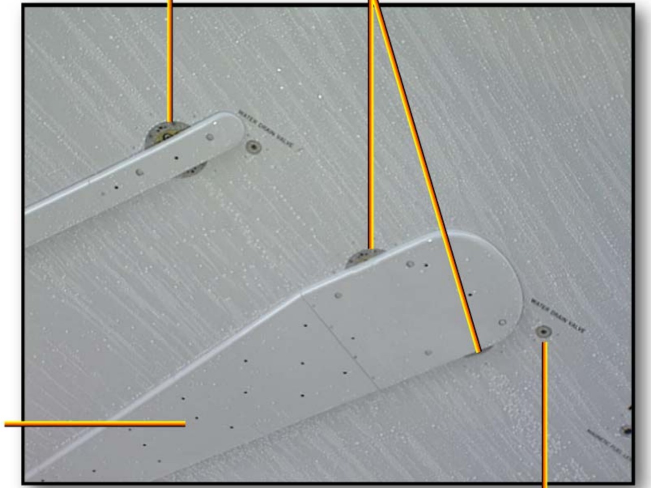
G6B08031 - G10T4T0 - FM28P8000000004



FUEL
PUMP
CANISTERS

COLLECTOR CELL

STBY PUMP
MAIN PUMPS

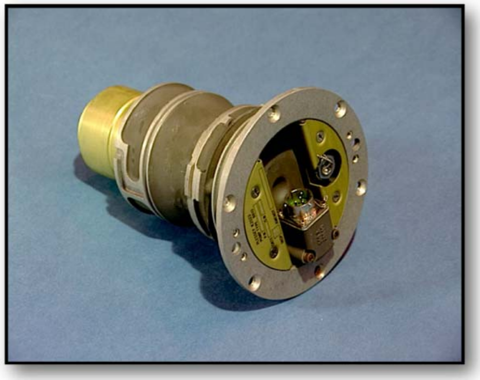


WING PUMP
ACCESS FAIRING

WING TANK PUMP ACCESS

WATER DRAIN VALVE

FUEL PUMP CANISTER



FUEL PUMP

Each pump is installed in a canister which is also installed at the bottom of the tank.

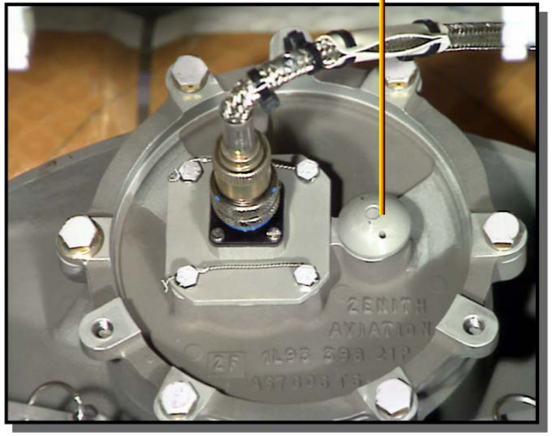
COMPONENT LOCATION

G6B08031 - G10T4T0 - FM28P8000000004

REFUEL COUPLING

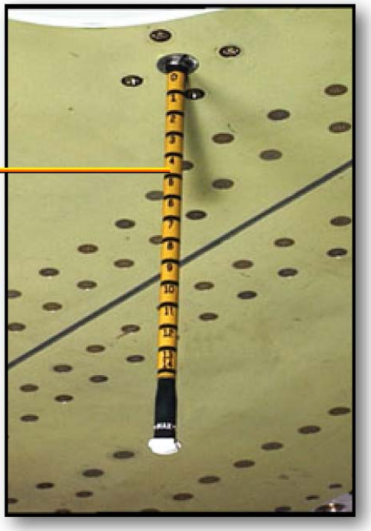
MAGNETIC FUEL LEVEL

MANUAL OVERRIDE

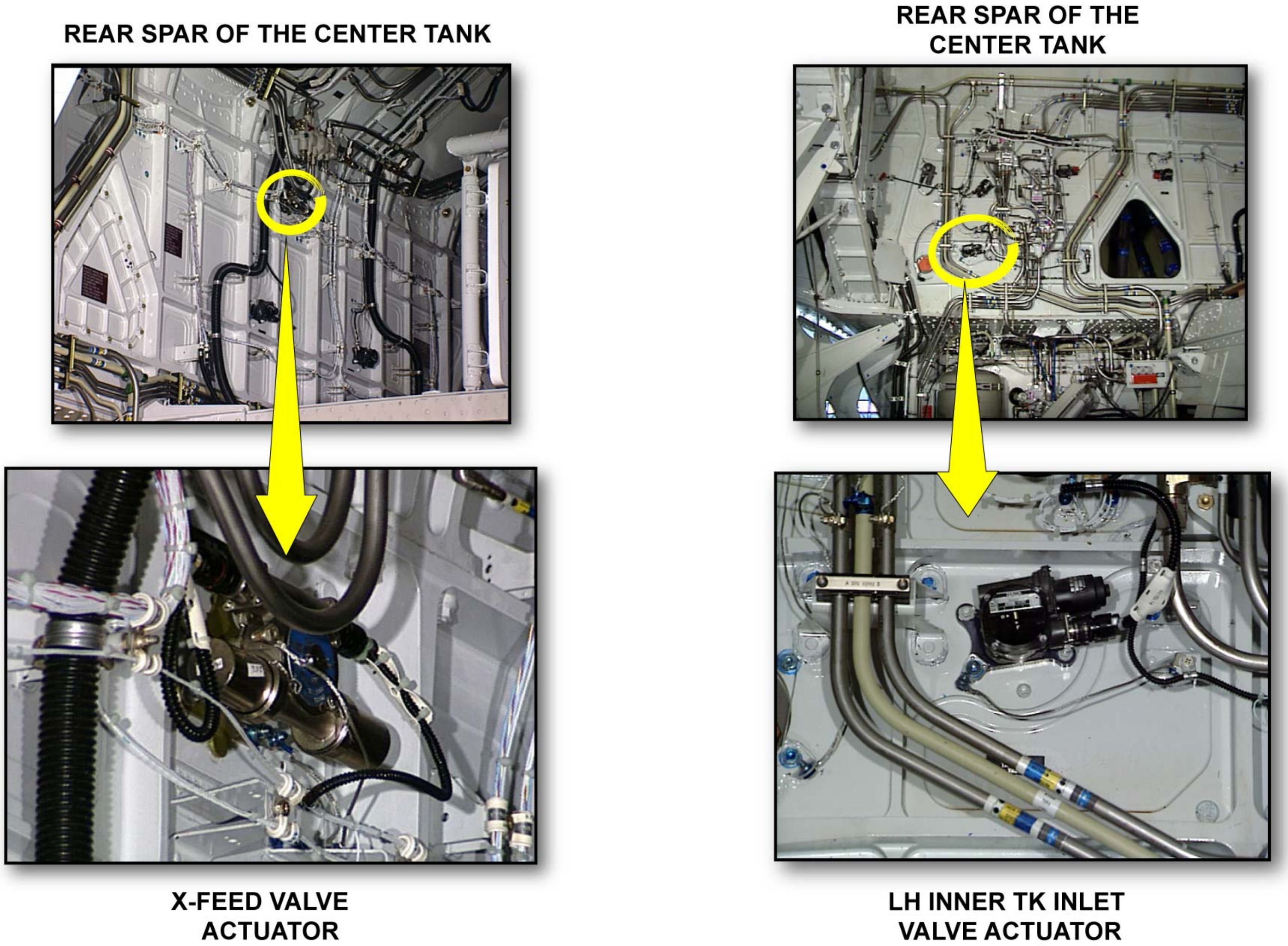


REFUEL ISOLATION VALVE

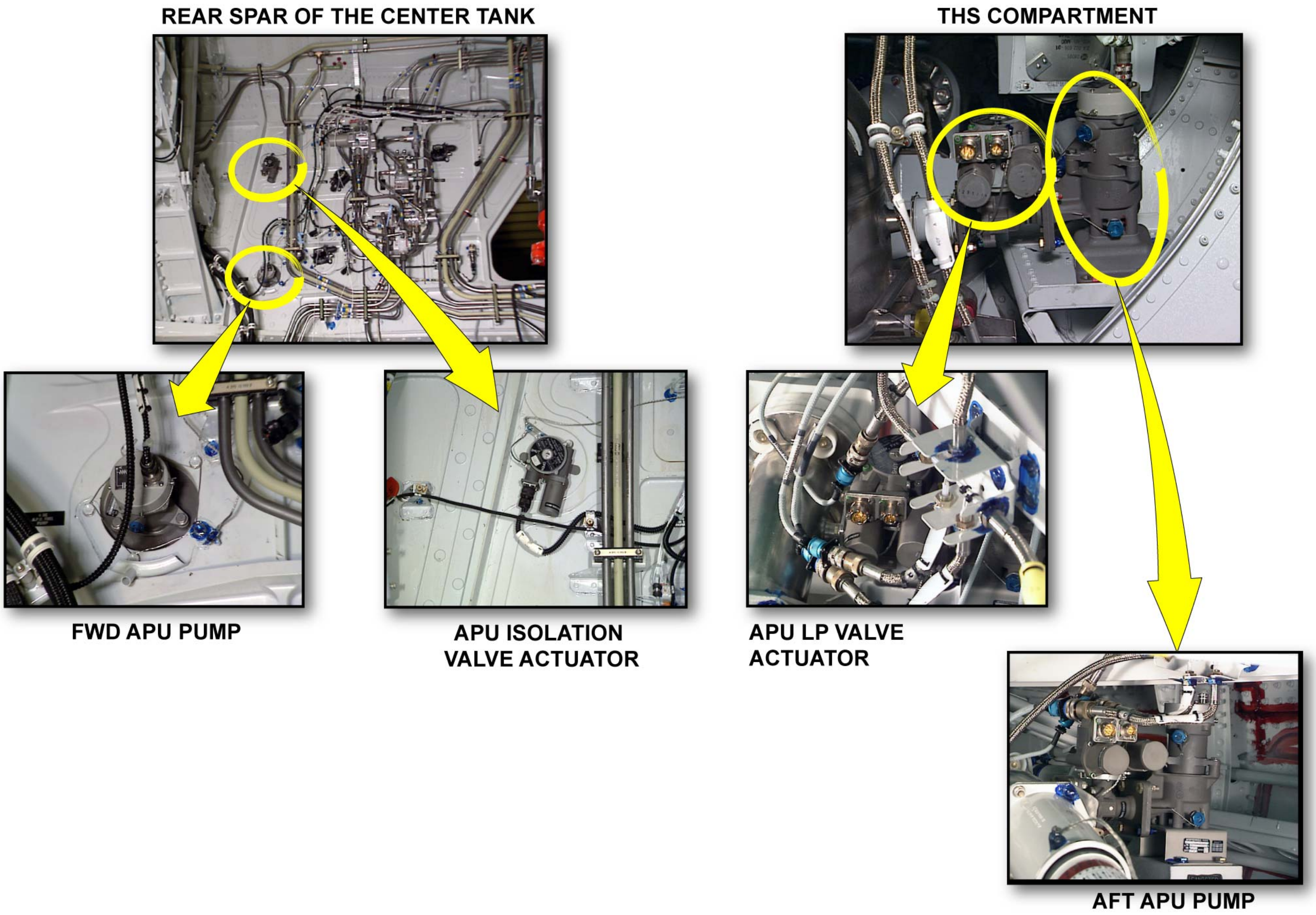
MANUAL MAGNETIC INDICATOR



COMPONENT LOCATION

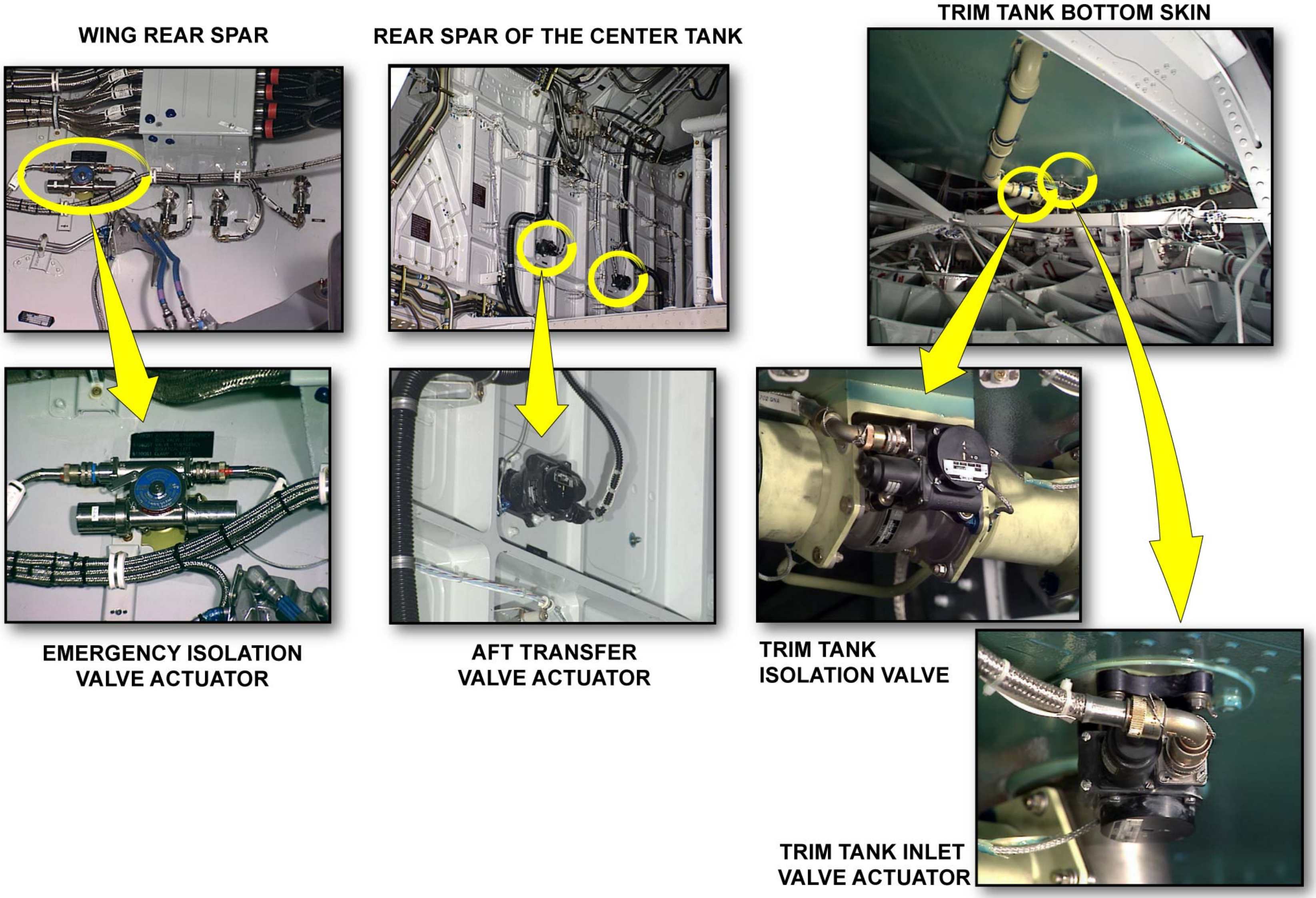


COMPONENT LOCATION



COMPONENT LOCATION

G6B08031 - G10T4T0 - FM28P8000000004



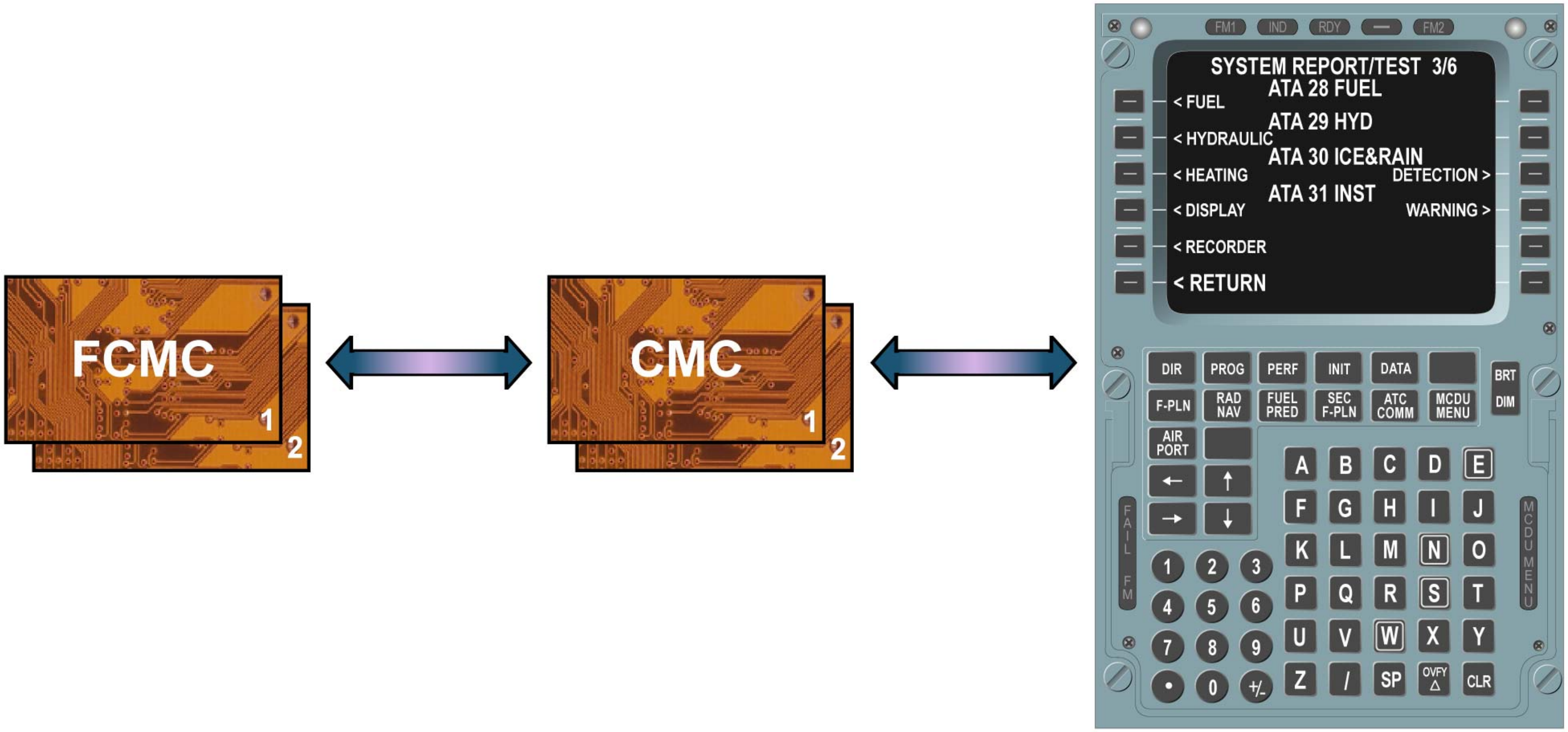
COMPONENT LOCATION

This Page Intentionally Left Blank

28 FUEL SYSTEM PRESENTATION (A330-300) (1)

MAINTENANCE/TEST FACILITIES

Each FCMC has a BITE. The BITE continuously monitors the FCMCs and fuel system components for failures. It is connected to the Centralized Maintenance Computers (CMC) and can be interrogated from the MCDU for fuel data reports or test functions.



FCMC: Fuel Control Management Computer
CMC: Central Maintenance Computer

MAINTENANCE/TEST FACILITIES

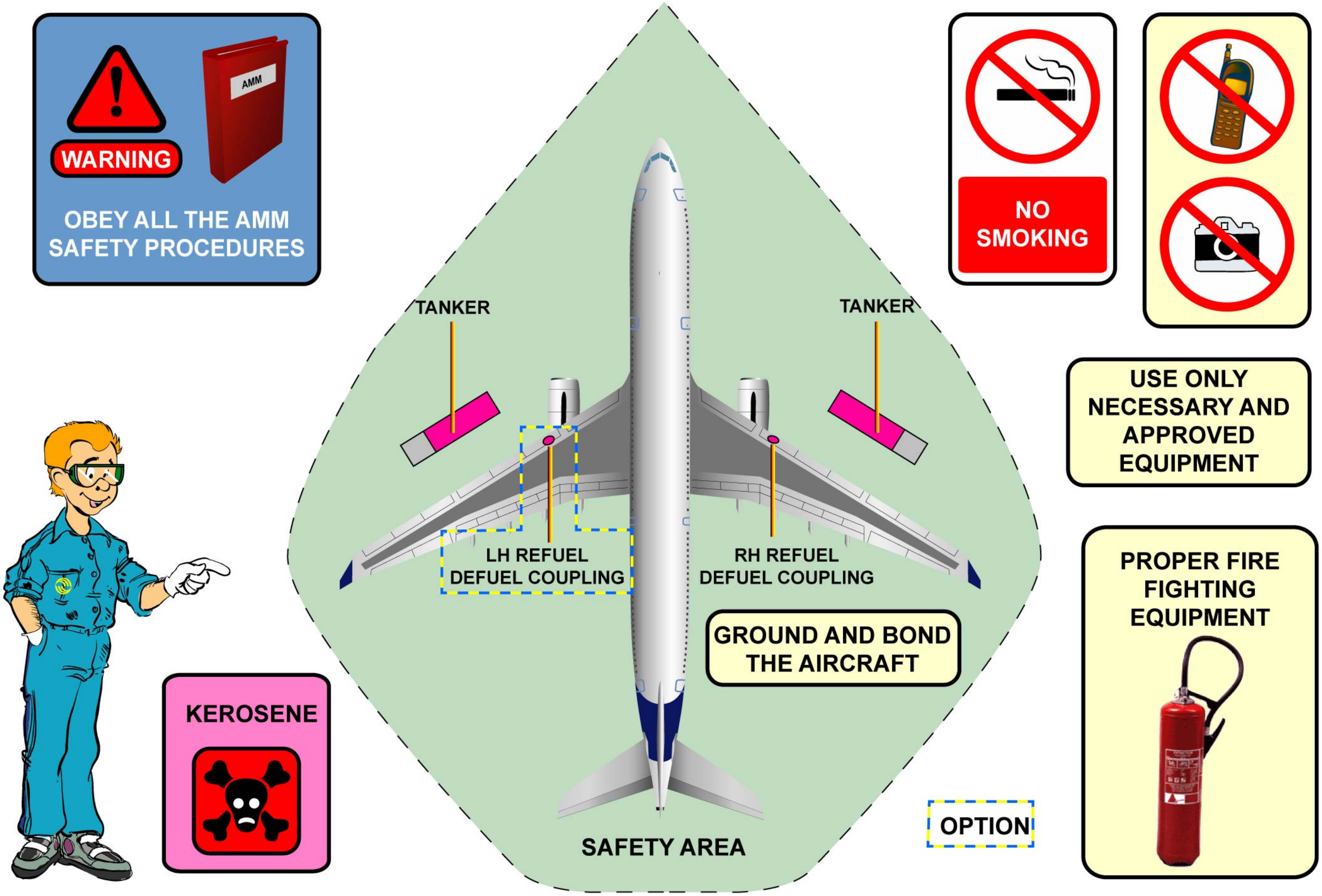
28 FUEL SYSTEM PRESENTATION (A330-300) (1)

SAFETY PRECAUTIONS

When you work on A/C, make sure that you obey to all the AMM safety procedures. This will prevent injury to persons and/or damage to the A/C. Here is an overview of the main safety precautions relative to the fuel system. Kerosene is poisonous. Do not splash A/C fuel in your eyes, mouth, nose and ears or on your skin. Use the approved protective clothing to prevent personal contamination and formation of static electricity. Make sure that you have the proper fire fighting equipment available. Make sure that the safety area is clear and clean. Respect the safety precautions within the safety distances. Put the NO SMOKING warning notices around the work area. Ground and bond the A/C.

In the Work area:

- do not use flames which do not have protection and do not use any material/tool which may cause sparks,
- use only necessary and approved electrical/electronic equipment,
- make sure that the air flow is sufficient to work safely, otherwise use a respirator,
- do not pull or move metal objects along the ground,
- immediately flush away or remove any fuel leakage.



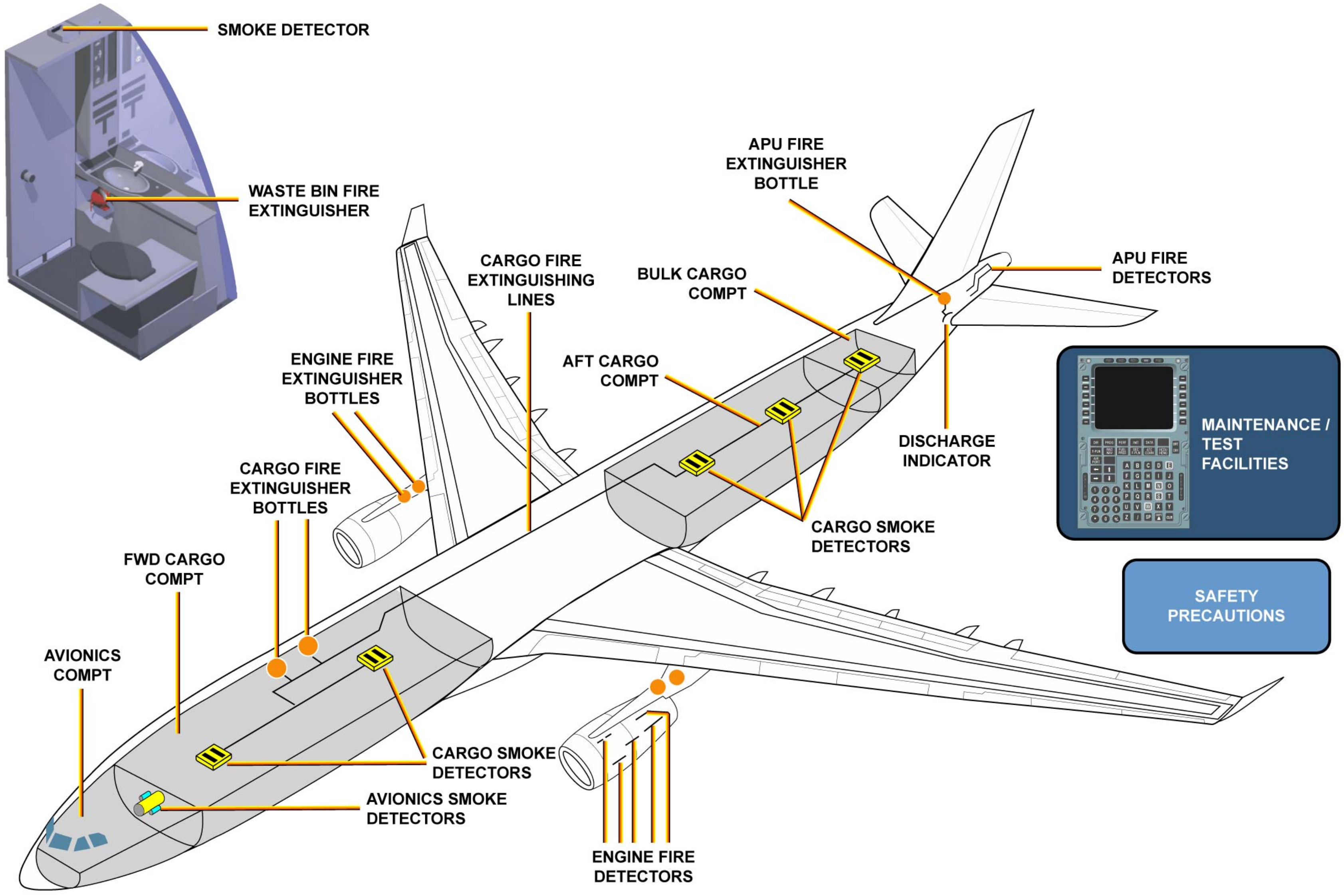
SAFETY PRECAUTIONS

26 FIRE PROTECTION SYS PRES. (RR700) (1)

GENERAL

This chapter includes:
- engine fire detection and extinguishing,
- APU fire detection and extinguishing,
- avionics compartment smoke detection,
- cargo compartments smoke detection and FIRE extinguishing,
- cabin and lavatories smoke detection.

It also includes the Maintenance/Test Facilities function.
When you work on the A/C, you must obey all the safety procedures, including warnings and cautions listed in the Aircraft Maintenance Manual (AMM).



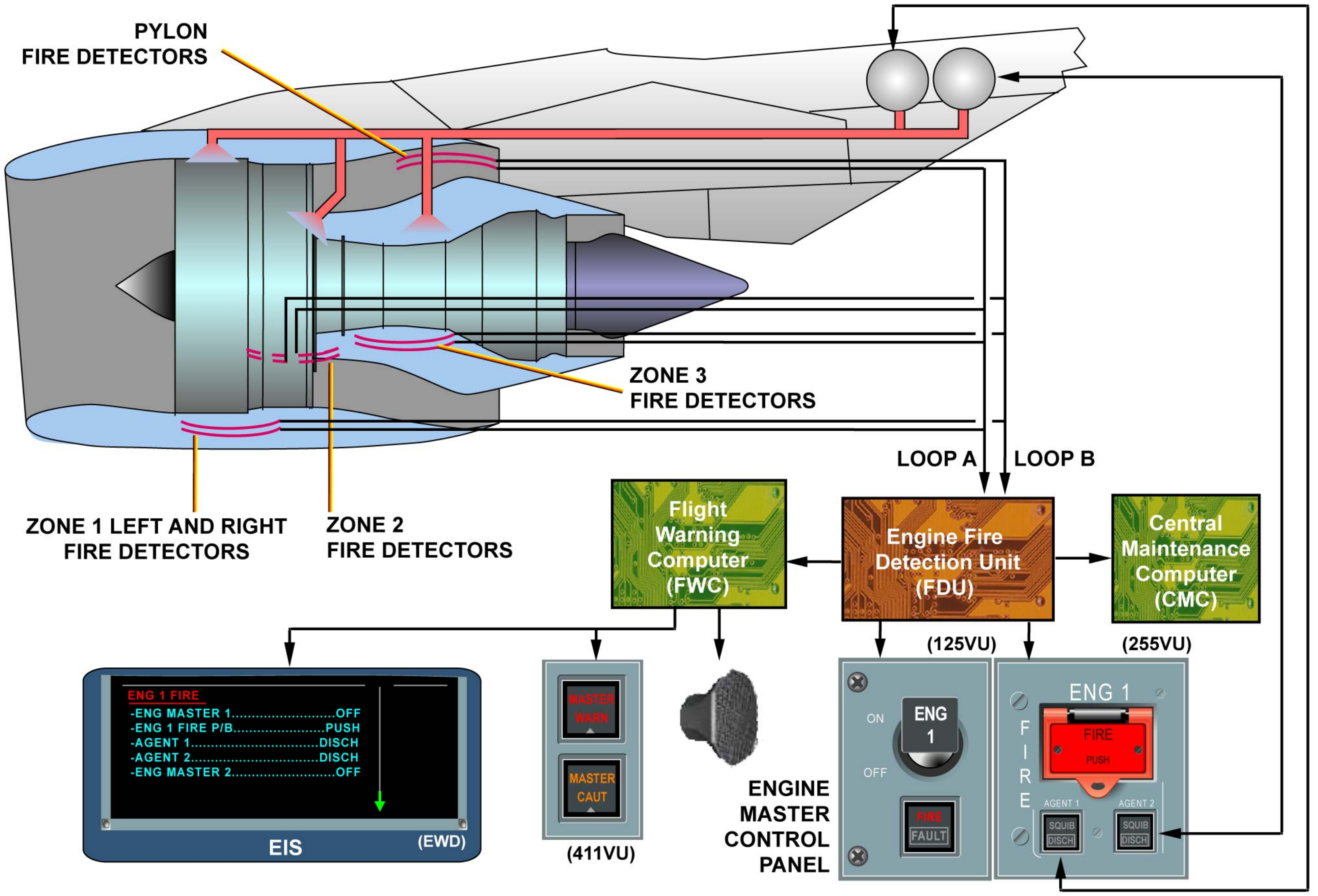
G6B08031 - G10T4T0 - FM26P8000000003

GENERAL

26 FIRE PROTECTION SYS PRES. (RR700) (1)

ENGINE FIRE PROTECTION

The engine fire protection is fulfilled by two systems: the fire detection system and the fire extinguishing system. The engine Fire Detection Unit (FDU) monitors two engine detector loops. Each loop has detector elements located in critical engine areas and connected in parallel. Warnings are generated according to an AND logic (both loops detect a FIRE). There are two fire bottles located in the engine pylon for engine FIRE extinguishing. The engine fire protection system gives aural and visual indications in FIRE and FAULT conditions.



ENGINE FIRE PROTECTION

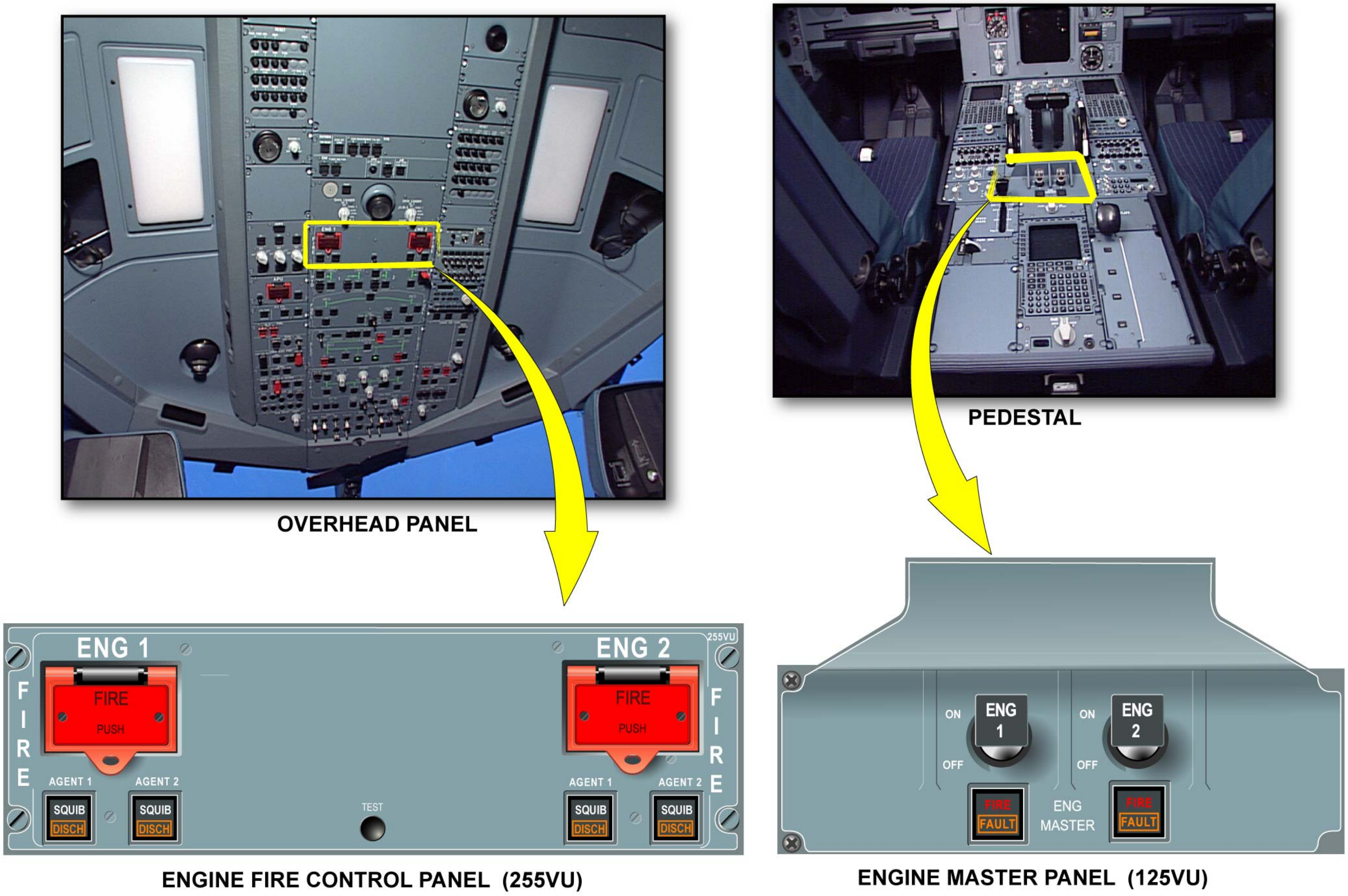
G6B08031 - G10T4T0 - FM26P8000000003

26 FIRE PROTECTION SYS PRES. (RR700) (1)

ENGINE FIRE PROTECTION (continued)

CONTROL AND INDICATING

The overhead ENGine FIRE control panel is used for detection and extinguishing functions. In addition to these indications on the FIRE panel, there is the ENG MASTER panel located on the pedestal including a red FIRE indicator light for each engine.



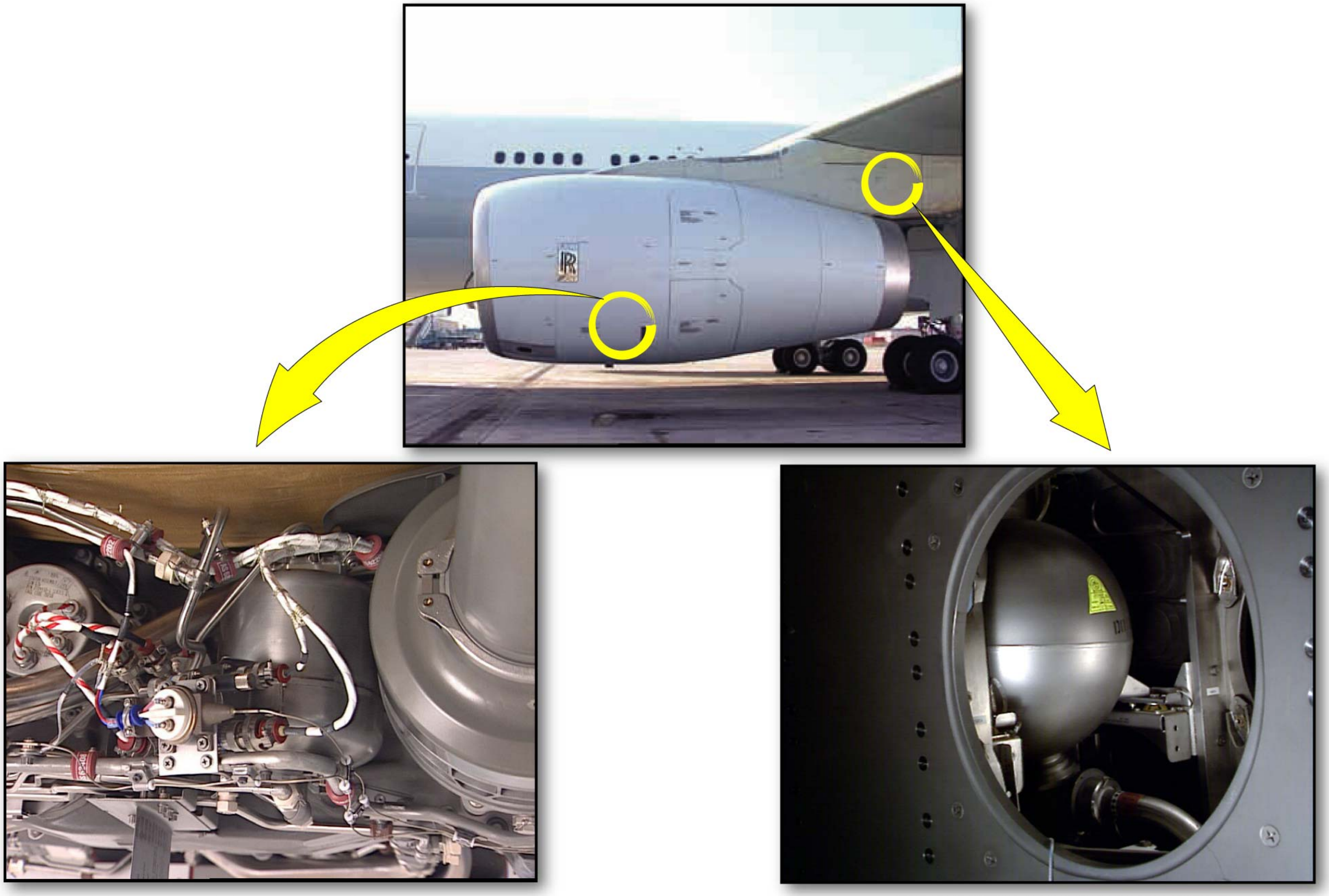
ENGINE FIRE PROTECTION - CONTROL AND INDICATING

26 FIRE PROTECTION SYS PRES. (RR700) (1)

ENGINE FIRE PROTECTION (continued)

COMPONENT LOCATION

Each fire detection loop contains 5 detector elements connected in parallel. The engine fire extinguishing bottles are located in the pylon. There are access panels on both sides of the pylon.



ENGINE GEARBOX FIRE DETECTOR

FIRE EXTINGUISHING BOTTLE

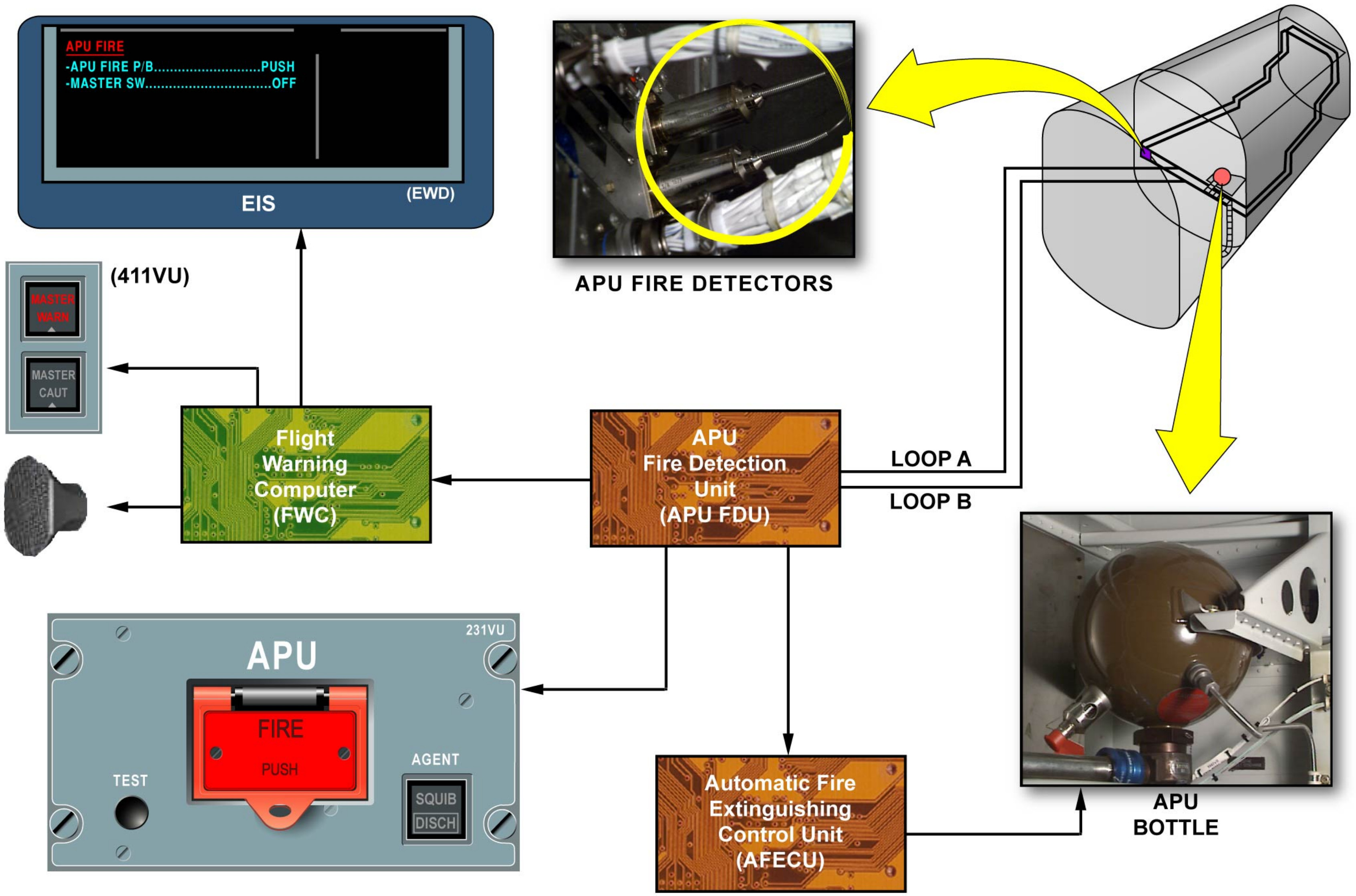
ENGINE FIRE PROTECTION - COMPONENT LOCATION

G6B08031 - G10T4T0 - FM26P8000000003

26 FIRE PROTECTION SYS PRES. (RR700) (1)

APU FIRE PROTECTION

The APU fire protection is done by two systems: the fire detection system and the fire extinguishing system. The APU Fire Detection Unit (FDU) monitors two detector loops. Each loop has a detector element located in the APU compartment. Warnings are generated according to an AND logic (both loops detect a FIRE). There is one fire bottle installed in the aft fuselage for the APU FIRE extinguishing. The APU fire can be manually or automatically extinguished.
The APU fire protection system gives aural and visual indications for FIRE and FAULT conditions. In case of a FIRE when the A/C is on the ground, the Automatic Fire Extinguishing Control Unit (AFECU) initiates an auto shutdown of the APU and discharges the extinguishing bottle.



APU FIRE PROTECTION

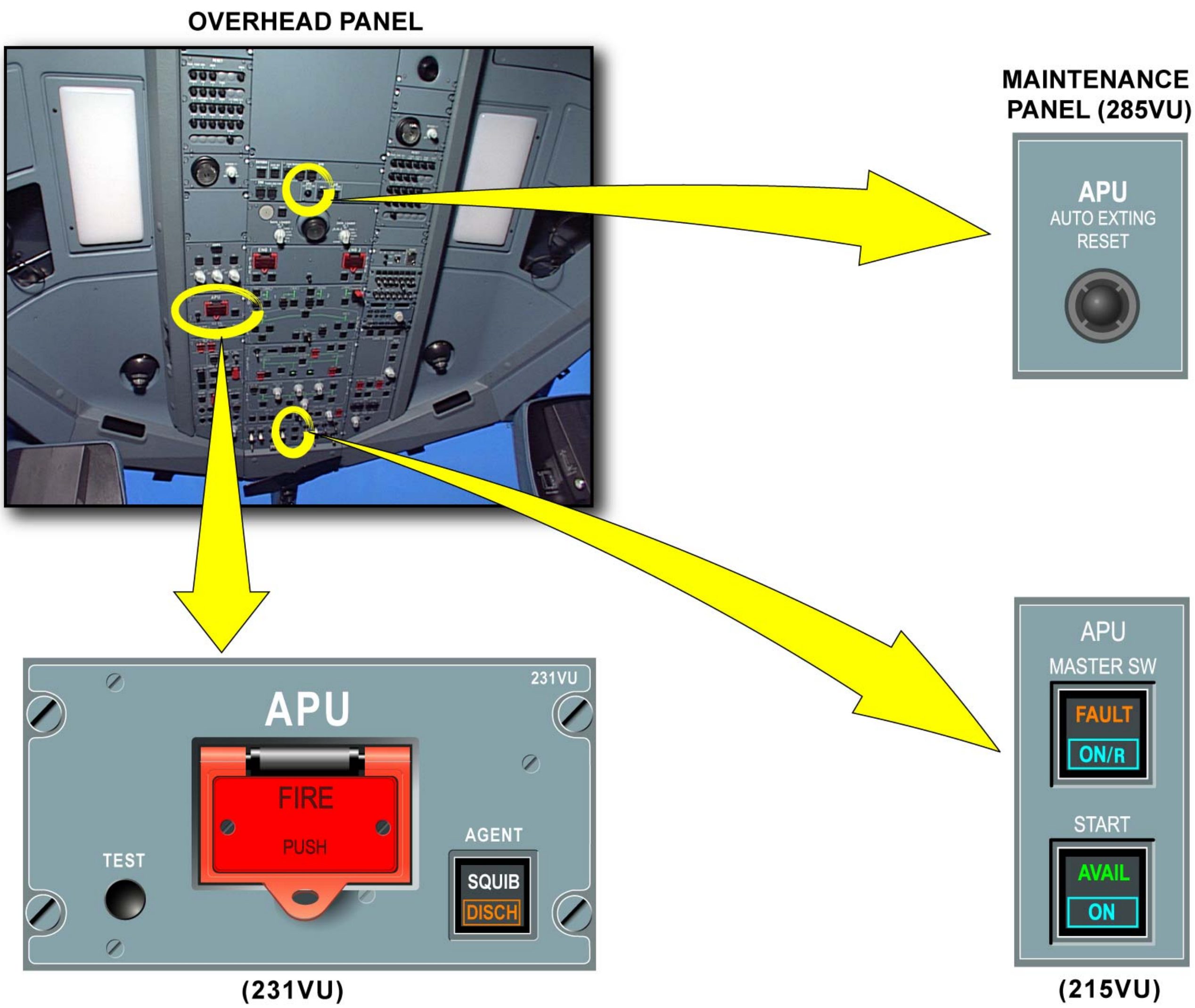
26 FIRE PROTECTION SYS PRES. (RR700) (1)

APU FIRE PROTECTION (continued)

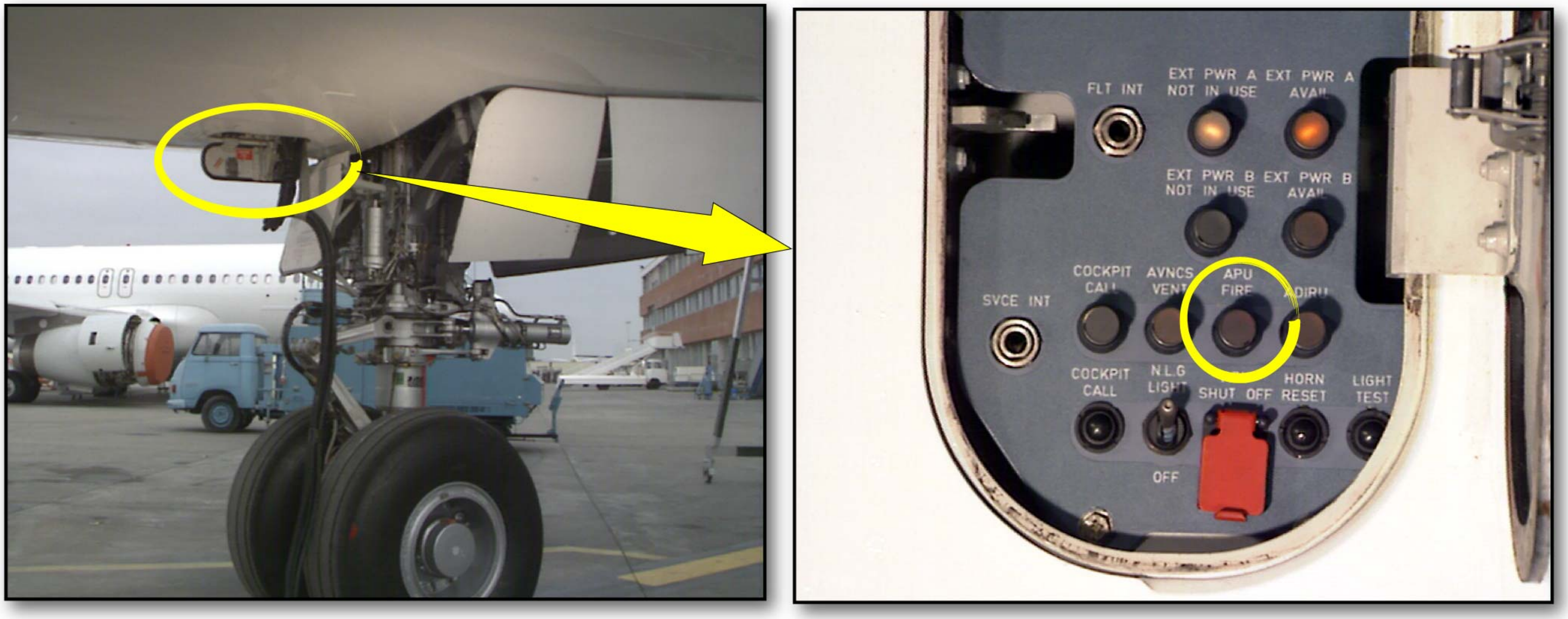
CONTROL AND INDICATING

The overhead APU FIRE panel handles both detection and extinguishing functions. As a consequence of an APU fire on ground (APU shutdown), the APU AUTO EXTING RESET P/BSW on the overhead maintenance panel enables the APU auto extinguishing system to be reset.
In case of an APU fire on ground, the APU FIRE light on the external power control panel will be triggered along with the ground call horn located in the nose landing gear bay.

G6B08031 - G10T4T0 - FM26P8000000003



APU FIRE PROTECTION - CONTROL AND INDICATING



EXTERNAL POWER CONTROL PANEL (925VU)

GROUND CALL HORN

APU FIRE PROTECTION - CONTROL AND INDICATING

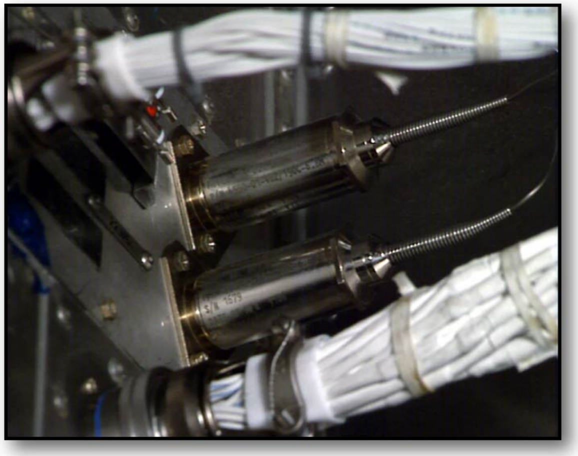
This Page Intentionally Left Blank

26 FIRE PROTECTION SYS PRES. (RR700) (1)

APU FIRE PROTECTION (continued)

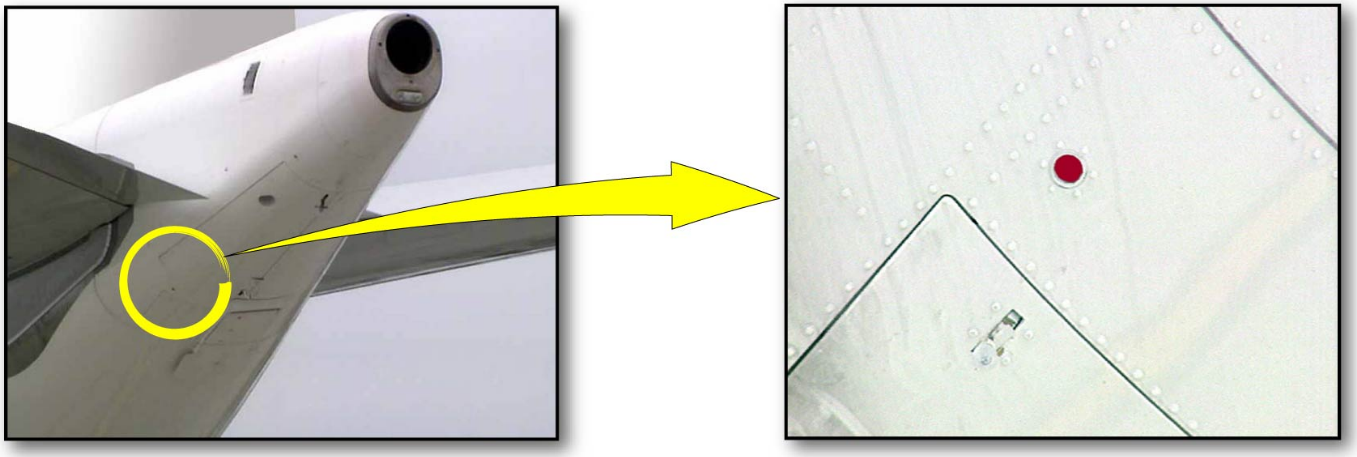
COMPONENT LOCATION

Each APU fire detection loop is a single detector element installed around the interior of the APU compartment. The APU engine fire extinguishing bottle is installed in the aft fuselage forward of the APU firewall. There is an access panel on the lower fuselage. An overpressure discharge indicator (red disc) is visible from the outside. The absence of a red disc indicates a bottle overpressure discharge.



APU FIRE DETECTORS

APU FIRE BOTTLE



APU FIRE BOTTLE DISCHARGE INDICATOR

APU FIRE PROTECTION - COMPONENT LOCATION

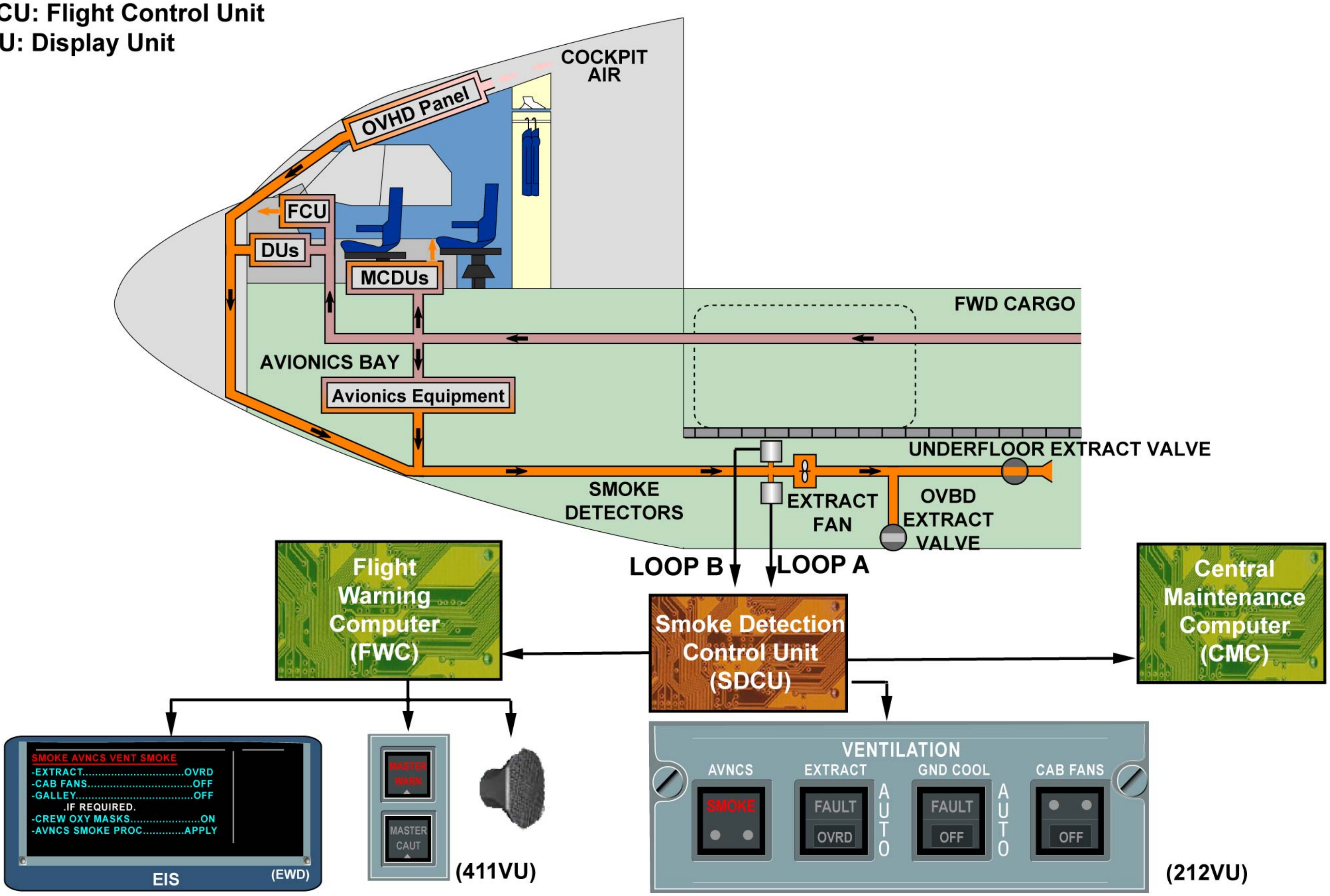
G6B08031 - G10T4T0 - FM26P8000000003

26 FIRE PROTECTION SYS PRES. (RR700) (1)

AVIONICS COMPARTMENT SMOKE DETECTION

The avionics compartment smoke detection is done by two smoke detectors installed on the air extraction duct of the ventilation system. The detectors send signals via a dual loop to the Smoke Detection Control Unit (SDCU). The SDCU gives aural and visual indications in SMOKE and FAULT conditions.

OVHD Panel: Overhead Panel
FCU: Flight Control Unit
DU: Display Unit



AVIONICS COMPARTMENT SMOKE DETECTION

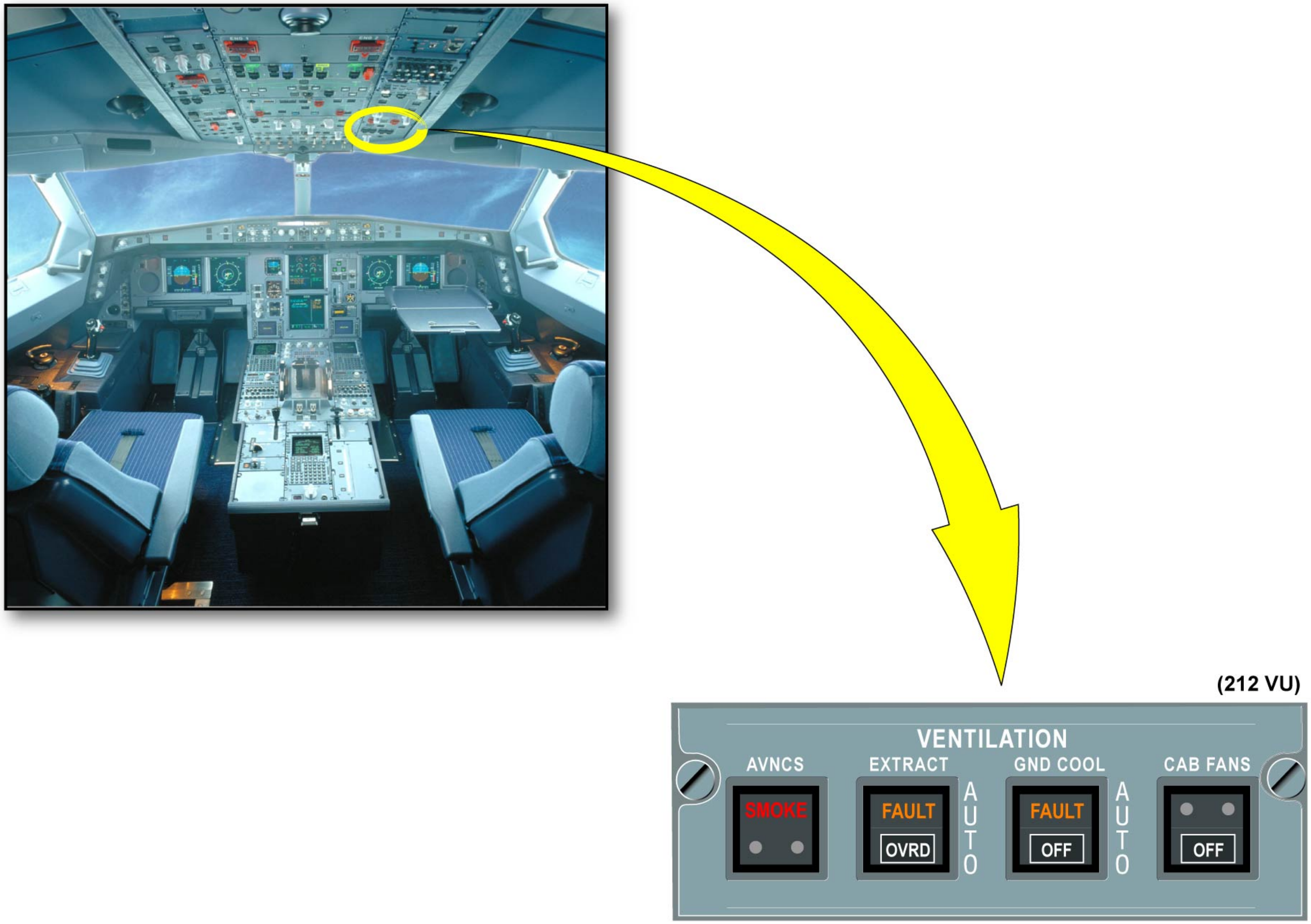
26 FIRE PROTECTION SYS PRES. (RR700) (1)

AVIONICS COMPARTMENT SMOKE DETECTION (continued)

CONTROL AND INDICATING

Avionics smoke is indicated on the VENTILATION panel in the cockpit. Pilot action on the VENTILATION panel is required as part of the AVIONICS SMOKE procedure in flight.
- on the VENTILATION panel, the AVioNiCS SMOKE light comes on,
- on the EXTRACT P/BSW, the FAULT light comes on.

G6B08031 - G10T4T0 - FM26P8000000003



AVIONICS COMPARTMENT SMOKE DETECTION - CONTROL AND INDICATING

G6B08031 - G10T4T0 - FM26P8000000003

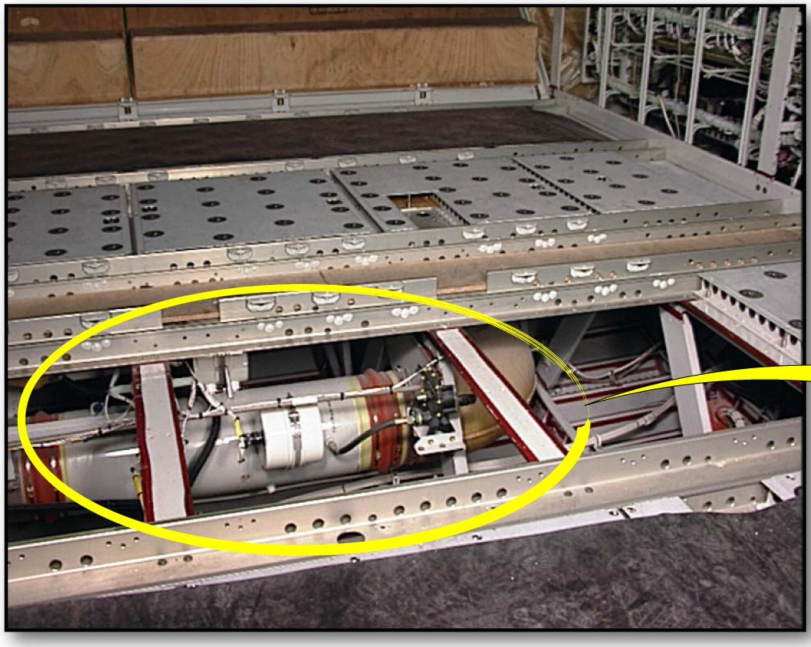
26 FIRE PROTECTION SYS PRES. (RR700) (1)

AVIONICS COMPARTMENT SMOKE DETECTION (continued)

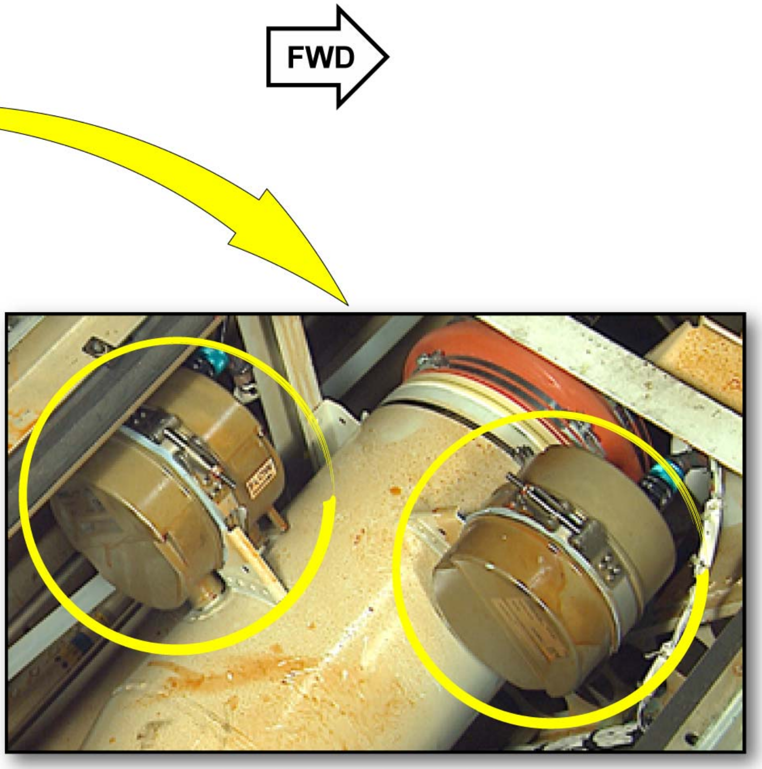
COMPONENT LOCATION

The two smoke detectors are located in the FWD cargo compartment in the ventilation extraction duct.

G6B08031 - G10T4T0 - FM26P8000000003



FWD CARGO COMPARTMENT



AVIONICS SMOKE DETECTORS

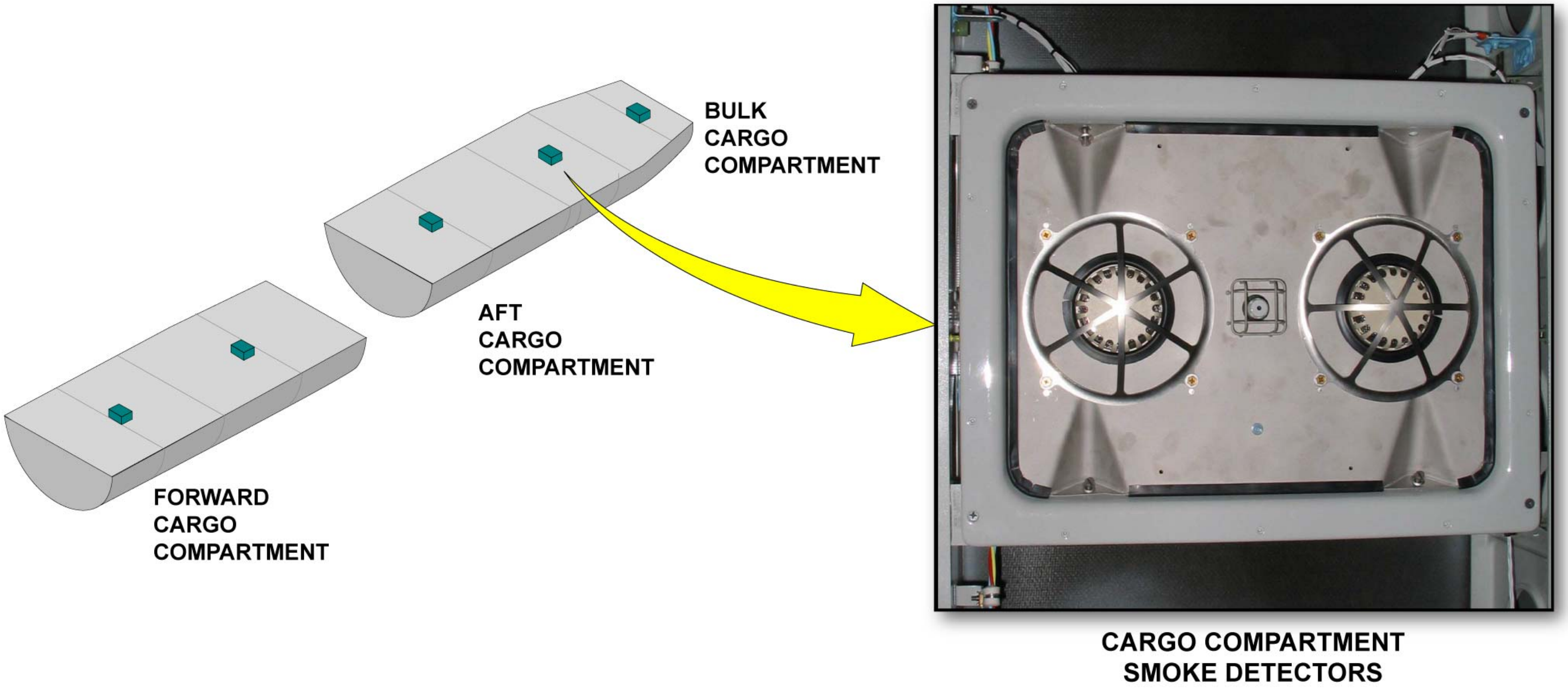
AVIONICS COMPARTMENT SMOKE DETECTION - COMPONENT LOCATION

26 FIRE PROTECTION SYS PRES. (RR700) (1)

CARGO COMPARTMENTS SMOKE PROTECTION

Each cargo compartment has cavities:
- 2 cavities in the FWD cargo compartment,
- 2 cavities in the AFT cargo compartment,
- 1 cavity in the BULK cargo compartment,

and each cavity holds 2 smoke detectors and a fire extinguishing nozzle.



CARGO COMPARTMENTS SMOKE PROTECTION

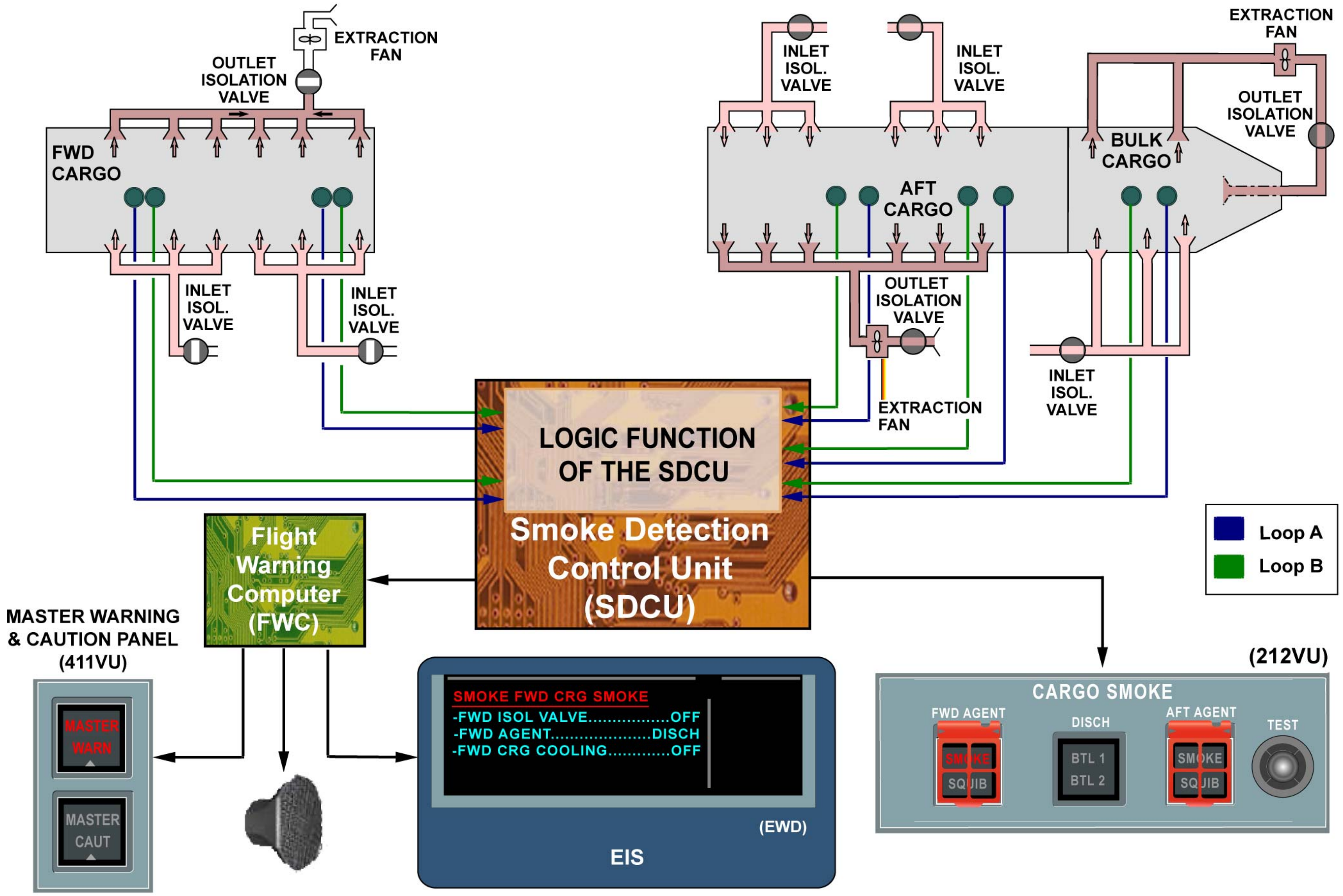
26 FIRE PROTECTION SYS PRES. (RR700) (1)

CARGO COMPARTMENTS SMOKE PROTECTION (continued)

SMOKE DETECTION

The cargo compartments smoke protection is done by two systems: the cargo smoke detection system and the cargo fire extinguishing system. Smoke detectors are optical type smoke detectors cells. The smoke detectors are connected to the SDCU via loop A and loop B.
When the SDCU confirms a smoke detection, it triggers warnings in the cockpit:
- a Continuous Repetitive Chime (CRC) a MASTER WARNing, and an EWD fault message through the Flight Warning Computer (FWC),
- on the CARGO SMOKE control panel.

When smoke is detected, isolation valves optionally installed in the affected compartment will automatically close and the extraction fan will stop.



CARGO COMPARTMENTS SMOKE PROTECTION - SMOKE DETECTION

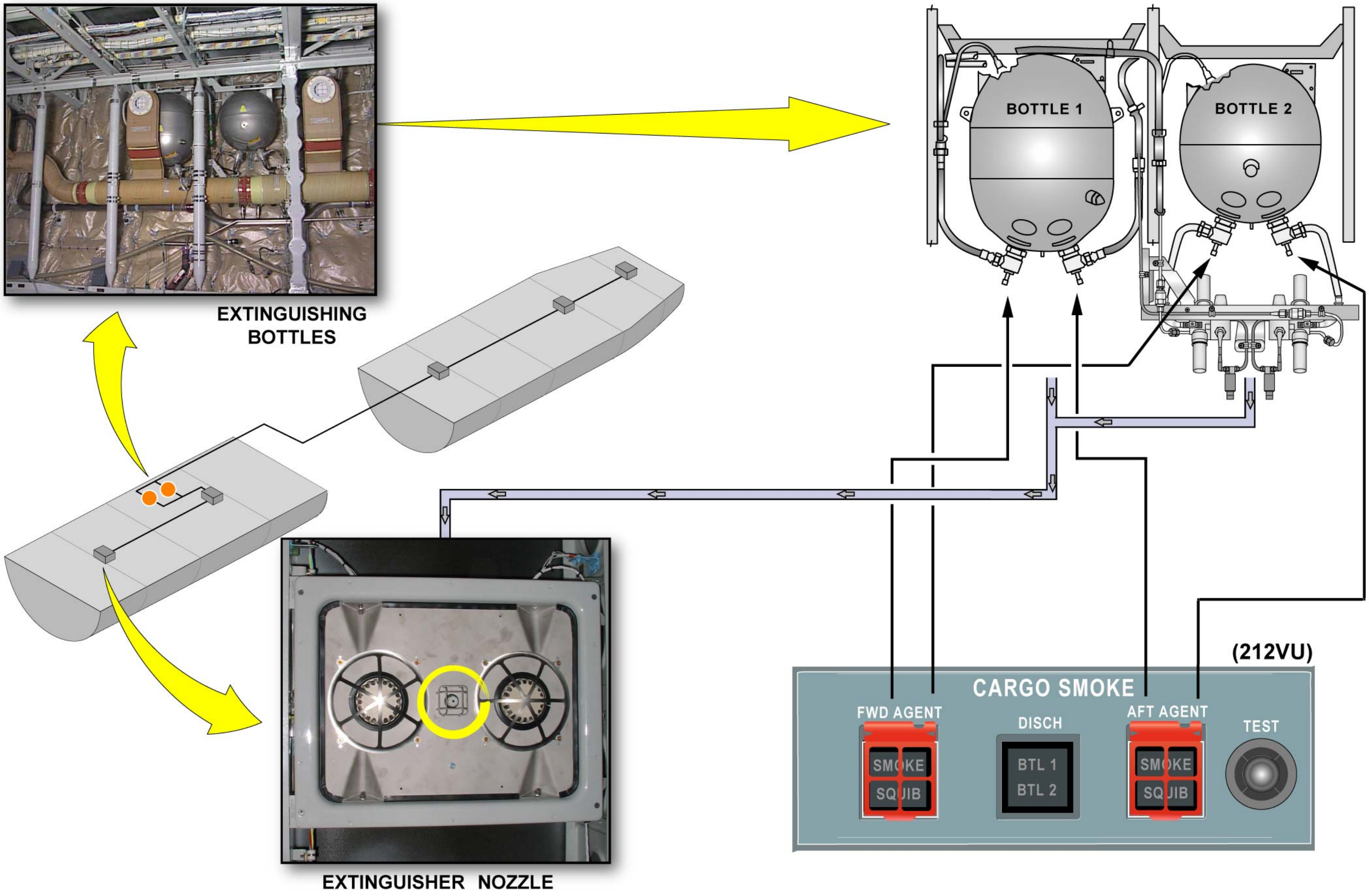
G6B08031 - G10T4T0 - FM26P8000000003

26 FIRE PROTECTION SYS PRES. (RR700) (1)

CARGO COMPARTMENTS SMOKE PROTECTION (continued)

FIRE EXTINGUISHING

Two fire extinguisher bottles located in the forward cargo compartment are also used for fire extinguishing in the Lower Deck Cargo Compartments (LDCCs). Each bottle has two discharge heads, one dedicated for the forward cargo compartment and one for the AFT/BULK cargo compartment. The extinguishing agent flows through rigid pipes and is sprayed out through the extinguisher nozzles in the forward, aft or bulk compartment.
The fire extinguisher bottles can be discharged from the cockpit by the CARGO SMOKE panel AGENT P/Bs.



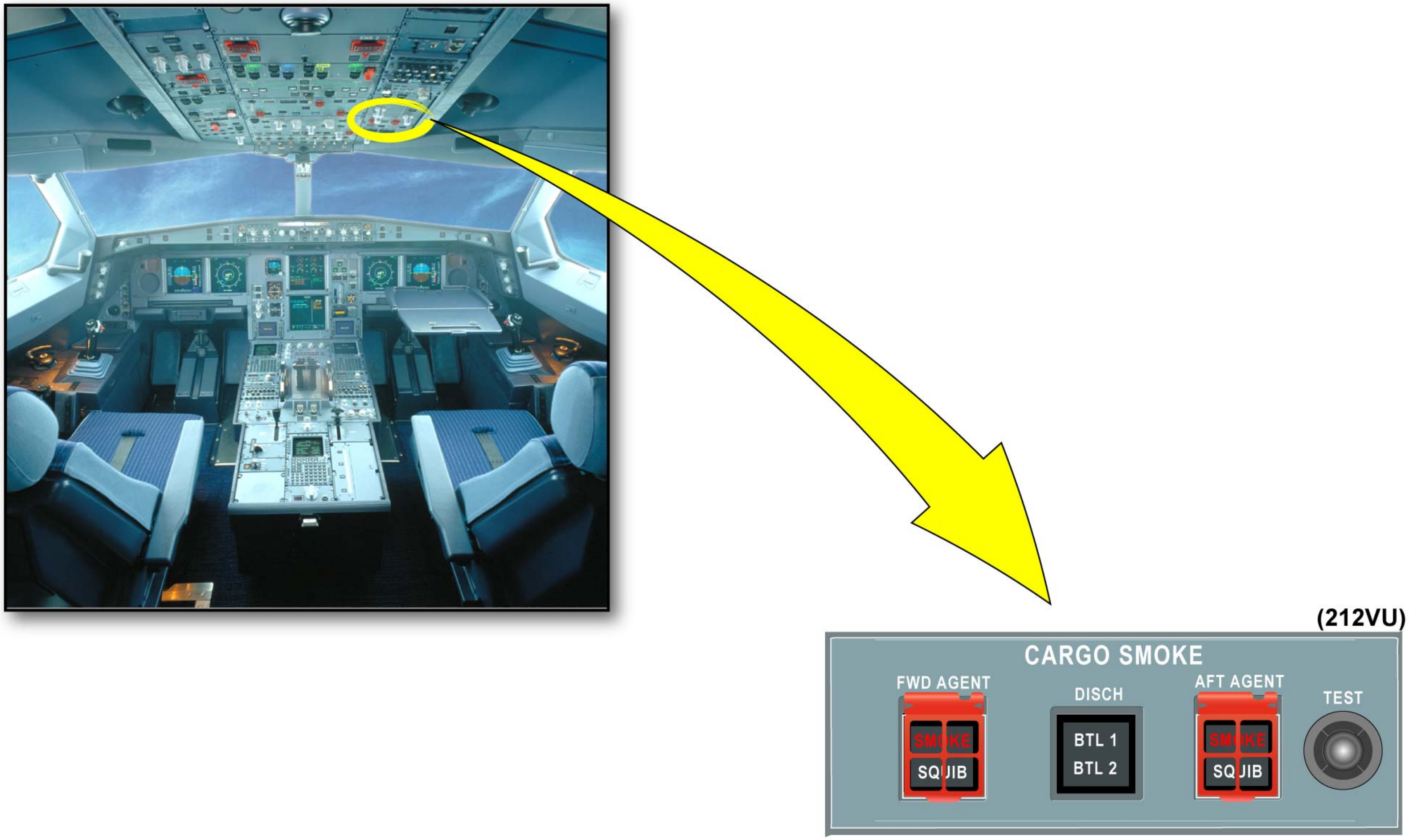
CARGO COMPARTMENTS SMOKE PROTECTION - FIRE EXTINGUISHING

26 FIRE PROTECTION SYS PRES. (RR700) (1)

CARGO COMPARTMENTS SMOKE PROTECTION (continued)

CONTROL AND INDICATING

The CARGO SMOKE panel on the overhead is used for detection and extinguishing functions.



G6B08031 - G10T4T0 - FM26P8000000003

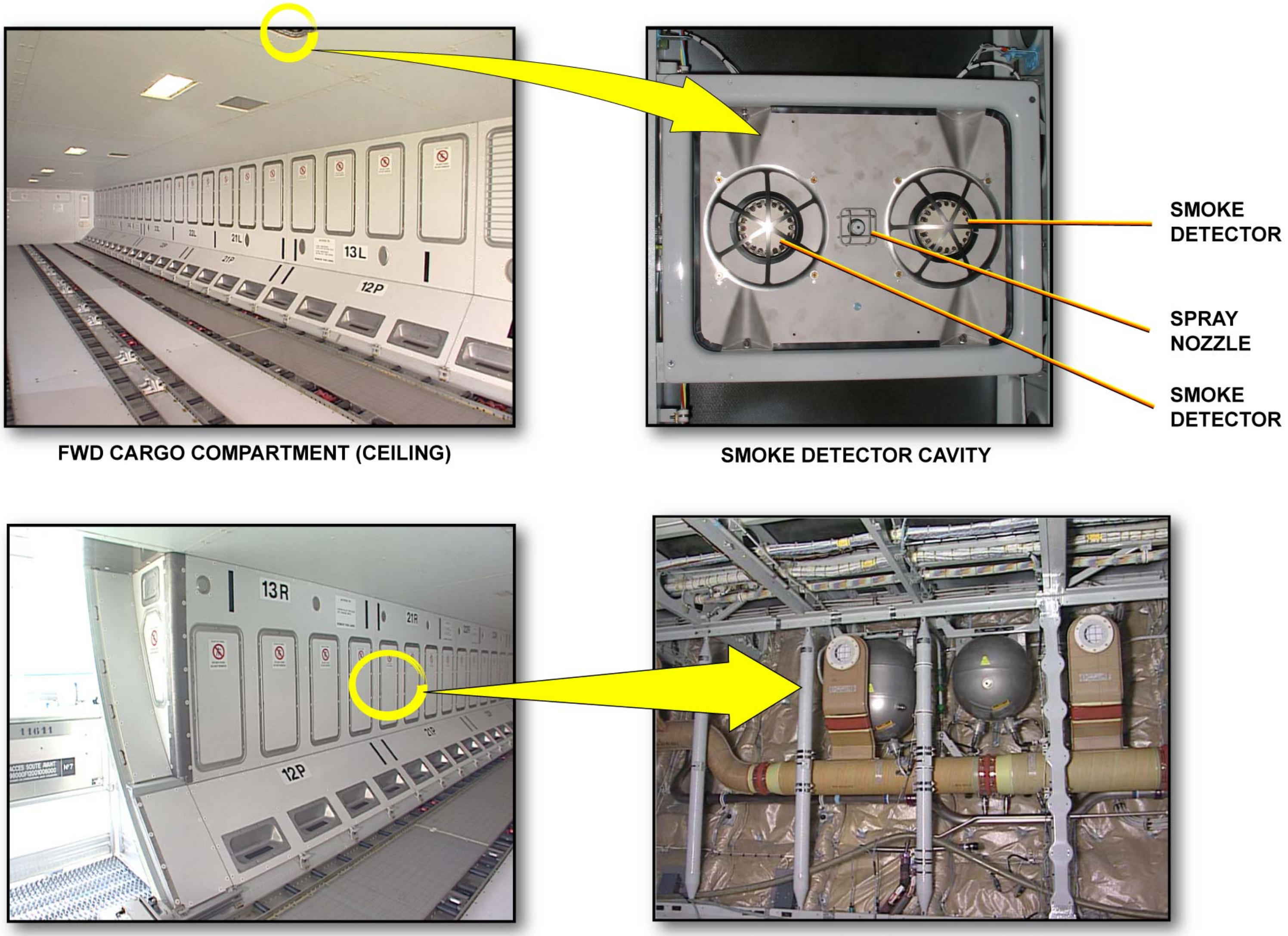
CARGO COMPARTMENTS SMOKE PROTECTION - CONTROL AND INDICATING

26 FIRE PROTECTION SYS PRES. (RR700) (1)

CARGO COMPARTMENTS SMOKE PROTECTION (continued)

COMPONENT LOCATION

Each cargo compartment has 2 smoke detectors in each cavity located in recessed panels in the compartment ceiling. Two fire extinguisher bottles are located in the FWD cargo compartment.



FWD CARGO COMPARTMENT (CEILING)

SMOKE DETECTOR CAVITY

FWD CARGO COMPARTMENT (RH SIDE)

FIRE EXTINGUISHER BOTTLES

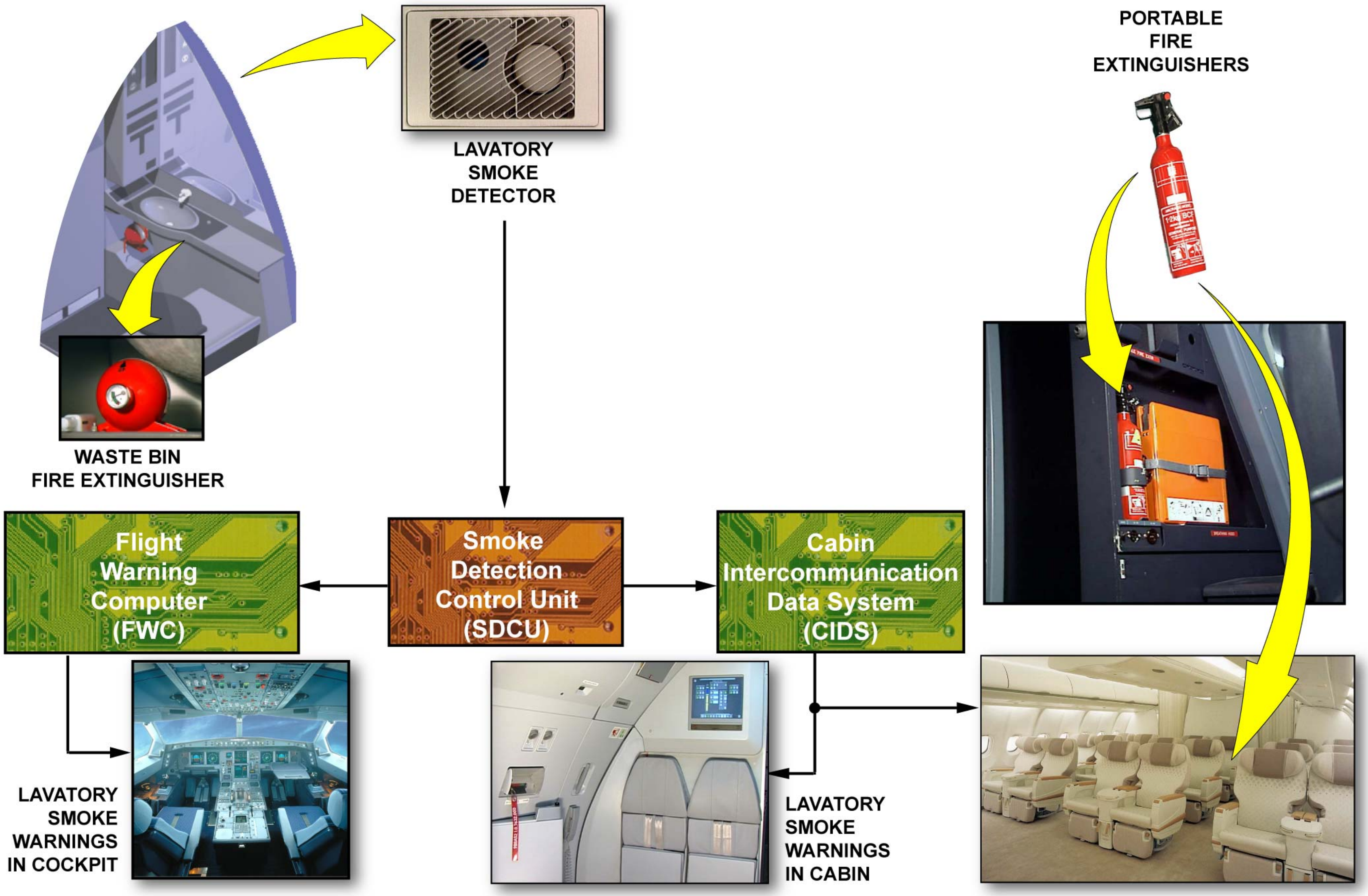
CARGO COMPARTMENTS SMOKE PROTECTION - COMPONENT LOCATION

G6B08031 - G10T4T0 - FM26P8000000003

26 FIRE PROTECTION SYS PRES. (RR700) (1)

CABIN AND LAVATORIES FIRE PROTECTION

The lavatory smoke detection system and the waste bin fire extinguishing system fulfill the lavatory fire protection. The system is monitored by the SDCU, which sends signals to the FWC, and to the Cabin Intercommunication and Data System (CIDS). The SDCU, the FWC, and the CIDS give aural and visual warning indications in the cockpit and in the cabin in SMOKE and FAULT conditions.
Each lavatory has a single smoke detector located in the air extraction duct in the lavatory ceiling. A fire extinguisher bottle is installed above the waste bin in each lavatory. If a fire starts in the waste bin the fire extinguisher discharges automatically. Portable fire extinguishers are located throughout the cabin and cockpit.



CABIN AND LAVATORIES FIRE PROTECTION

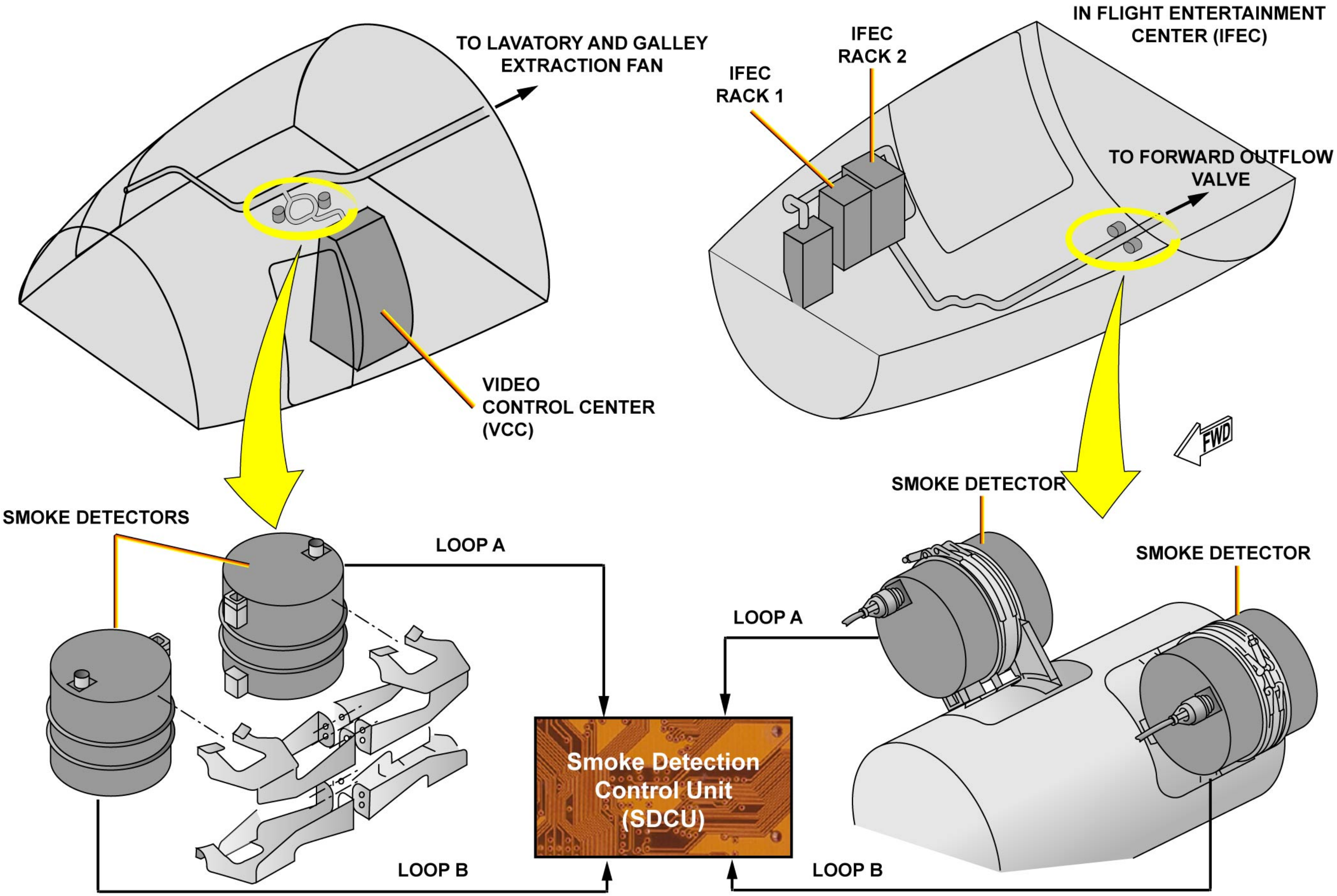
G6B08031 - G10T4T0 - FM26P8000000003

26 FIRE PROTECTION SYS PRES. (RR700) (1)

AUXILIARY AREAS SMOKE DETECTION

VCC AND IFEC SMOKE DETECTION

The Video Control Center (VCC) includes 2 smoke detectors on the extraction air duct, connected to the SDCU. The In-Flight Entertainment Center (IFEC) includes 2 smoke detectors on the extraction air duct, connected to the SDCU.

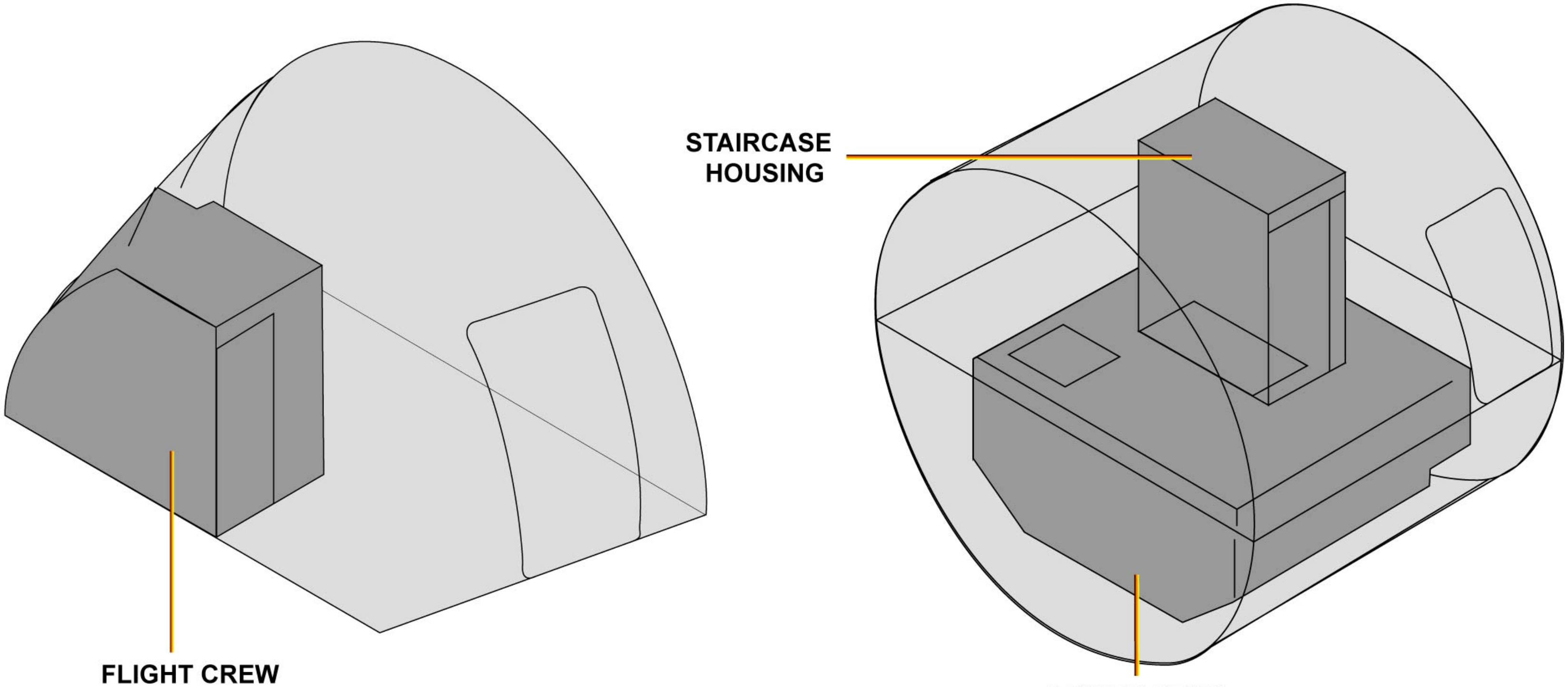


AUXILIARY AREAS SMOKE DETECTION - VCC AND IFEC SMOKE DETECTION

26 FIRE PROTECTION SYS PRES. (RR700) (1)

OPTIONS

There are some options, which may be selected by operators and which require fire protection:
- the Flight Crew Rest Compartment (FCRC), installed behind the cockpit,
- the Lower Deck Mobile Crew Rest (LD-MCR) and its associated staircase housing.



OPTIONS

G6B08031 - G10T4T0 - FM26P8000000003

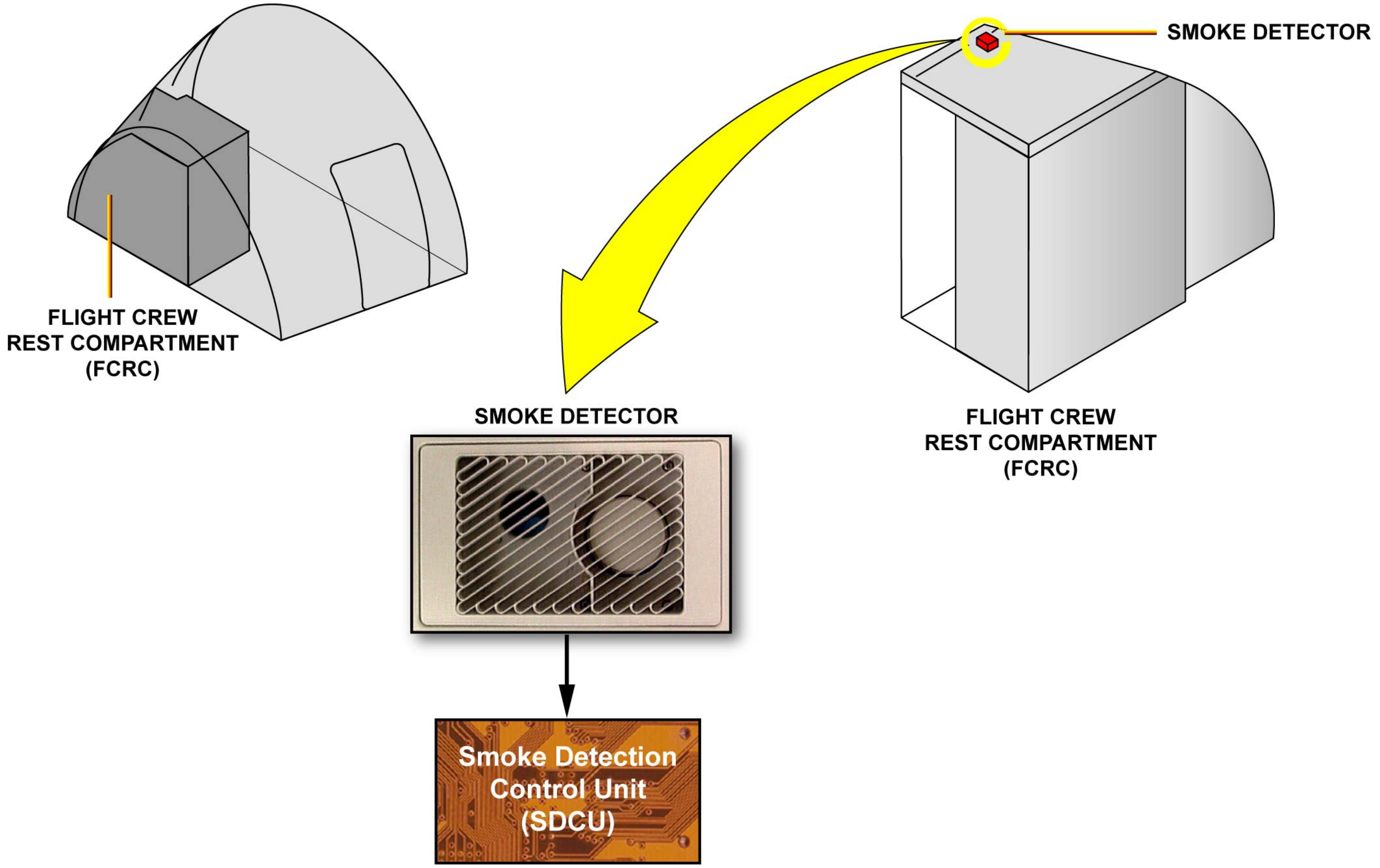
26 FIRE PROTECTION SYS PRES. (RR700) (1)

OPTIONS (continued)

FCRC SMOKE DETECTION

If installed the FCRC includes a smoke detector connected to the SDCU.

G6B08031 - G10T4T0 - FM26P8000000003



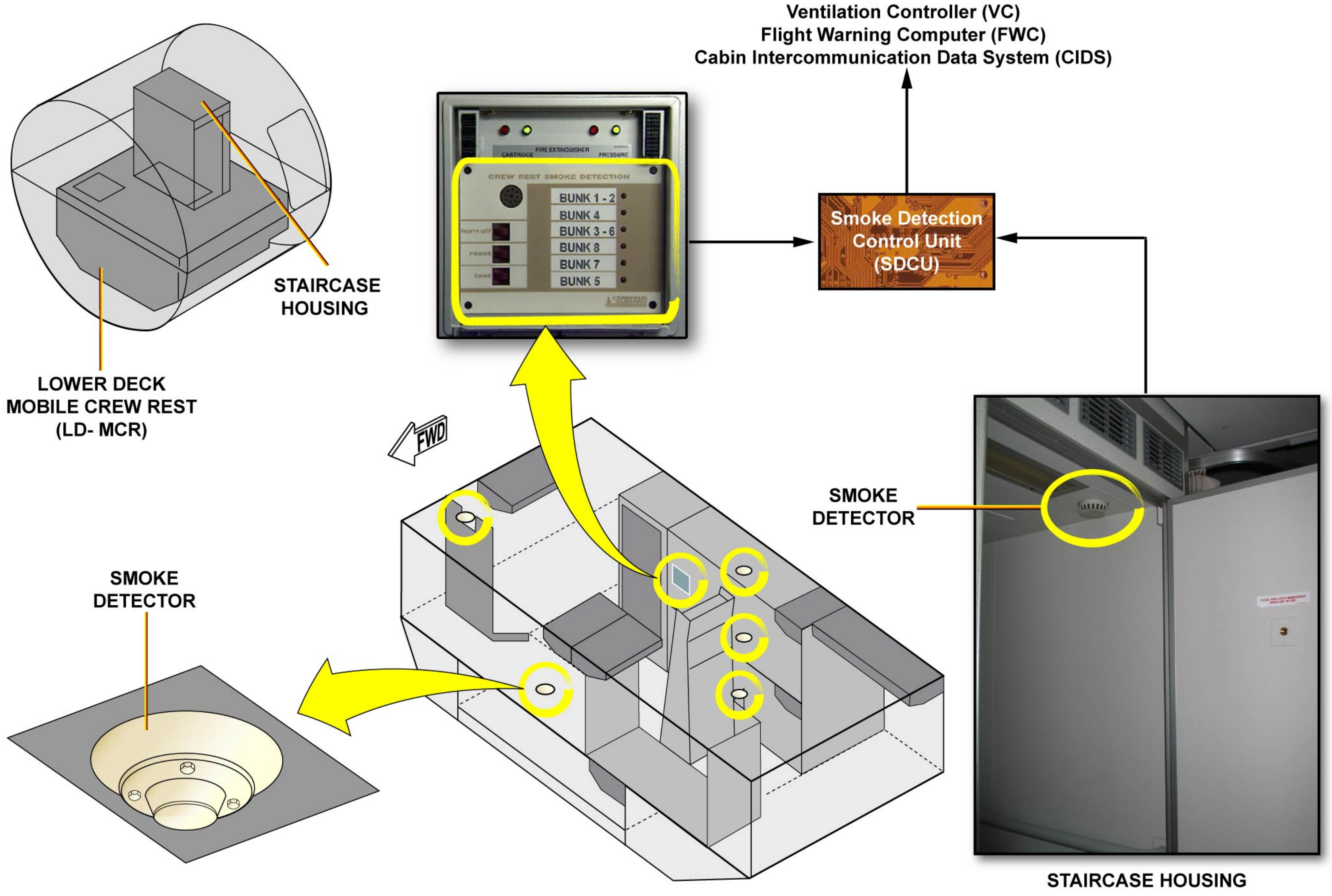
OPTIONS - FCRC SMOKE DETECTION

26 FIRE PROTECTION SYS PRES. (RR700) (1)

OPTIONS (continued)

LD-MCR SMOKE DETECTION

The LD-MCR smoke detection system operates independently from the other aircraft smoke detection systems and has 5 smoke detectors and a crew rest smoke detection control unit. The crew rest smoke detection control unit transmits a smoke alarm signal to the SDCU and the SDCU sends a smoke alarm signal to the Ventilation Controller (VC), the FWC and the CIDS. The staircase housing will have one smoke detector connected to the SDCU.



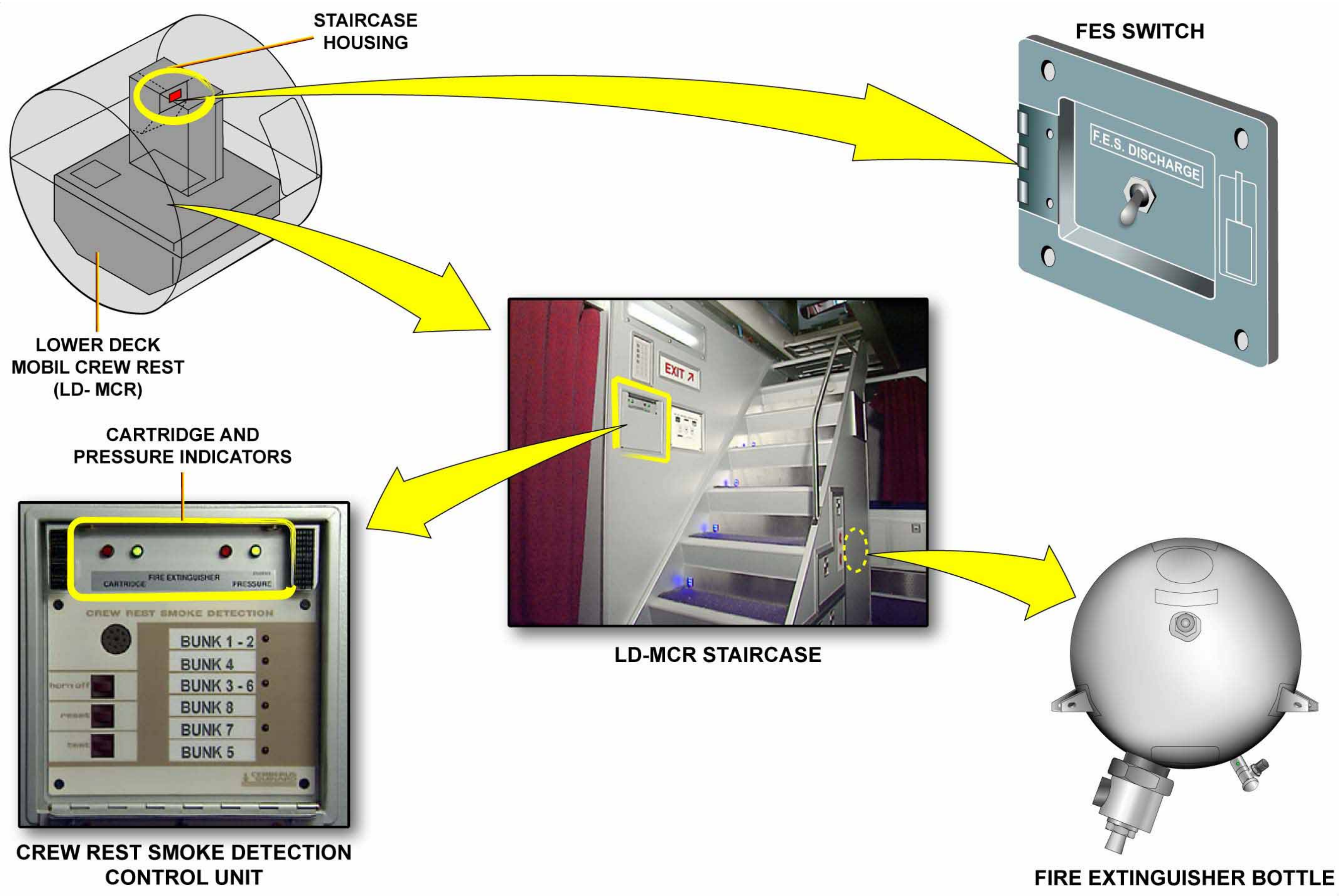
OPTIONS - LD-MCR SMOKE DETECTION

26 FIRE PROTECTION SYS PRES. (RR700) (1)

OPTIONS (continued)

LD-MCR FIRE EXTINGUISHING

The fire extinguishing system in the LD-MCR has one fire extinguisher bottle. The bottle is installed below the stairs in the LD-MCR. The LD-MCR fire-extinguishing system operates manually. A fire extinguisher panel is also installed in the LD-MCR. It has four indication LEDs. Two green indicator and two red warning LEDs, which show the condition of the cartridge and the pressure in the bottle. The FES switch controls the fire-extinguishing of the LD-MCR.



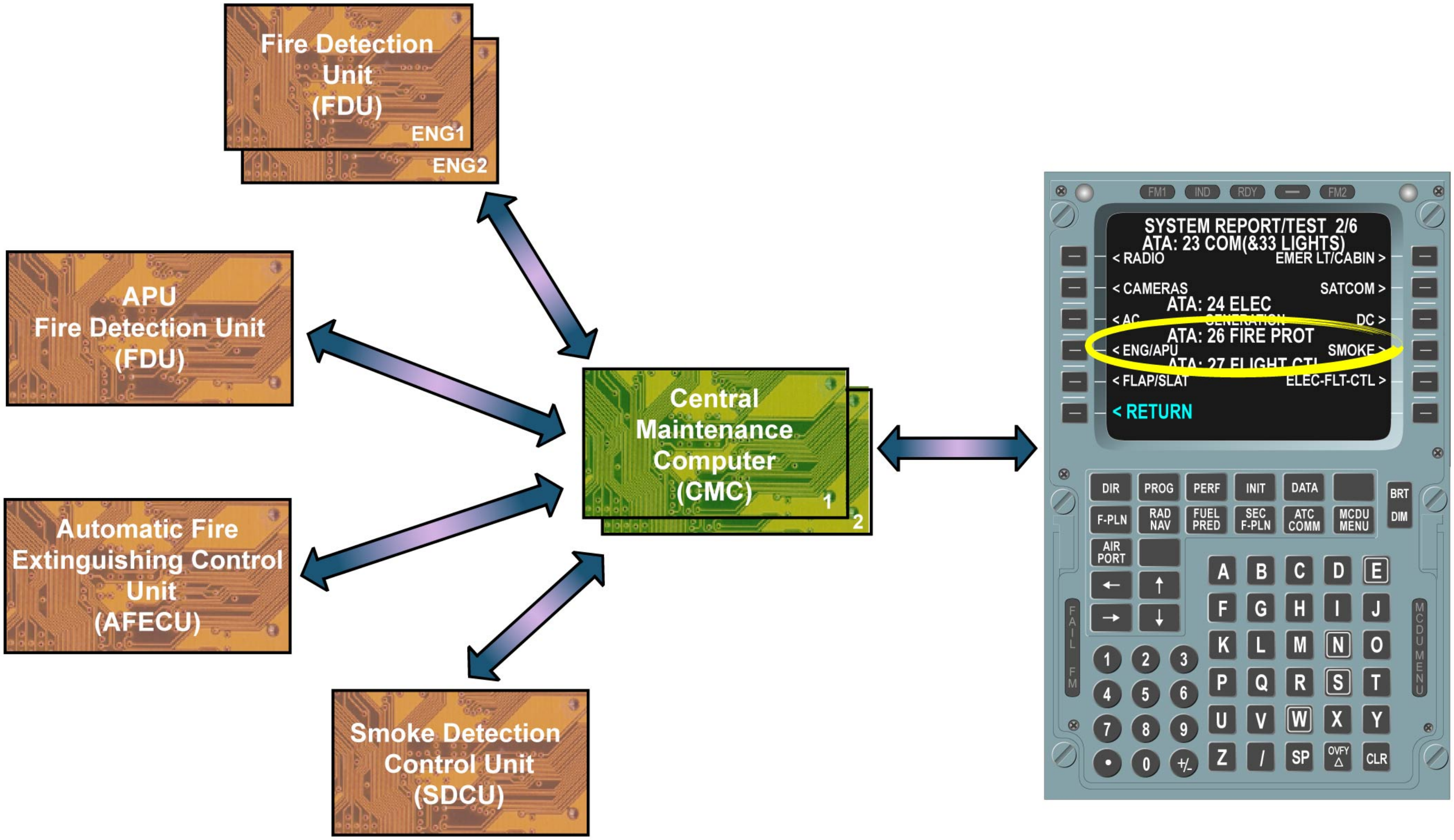
OPTIONS - LD-MCR FIRE EXTINGUISHING

G6B08031 - G10T4T0 - FM26P8000000003

26 FIRE PROTECTION SYS PRES. (RR700) (1)

MAINTENANCE/TEST FACILITIES

Each fire protection system computer has a BITE that tests, manages and records failures to help maintenance operations.



MAINTENANCE/TEST FACILITIES

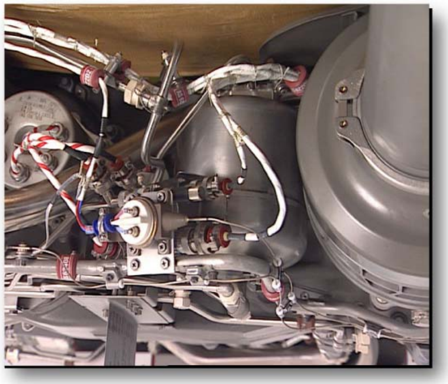
G6B08031 - G10T4T0 - FM26P8000000003

26 FIRE PROTECTION SYS PRES. (RR700) (1)

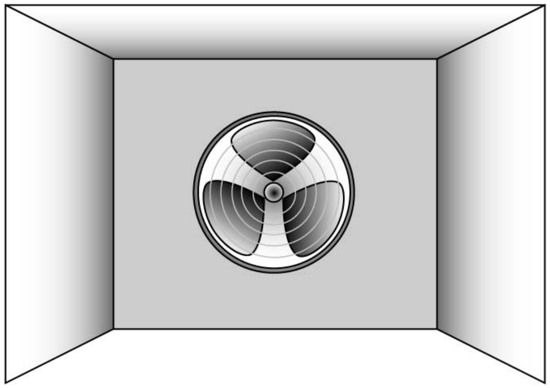
SAFETY PRECAUTIONS

When you work on the A/C, make sure that you obey all the AMM safety procedures. This will prevent injury to persons and/or damage to the A/C. Here is an overview of the main safety precautions relative to the fire protection system. Make sure that there is good airflow through the working area: fumes from a discharged fire extinguisher bottle can cause injury to persons. Install or remove the fire detector elements carefully. You can easily cause damage to them. Move a filled fire extinguisher bottle carefully: A heavy shock or damage to the frangible disc can cause unwanted discharge and seriously injure persons who are in the proximity.

Install and remove the fire detector elements carefully.



A good airflow in the work area must be ensured.



Remove the cartridge before disassemble the bottle. The cartridge is an explosive device. Explosion of the cartridge can cause injury to persons. If the cartridge is still active (not fired):
- install the shunt device to prevent an explosion,
- do not use a foil shunt.

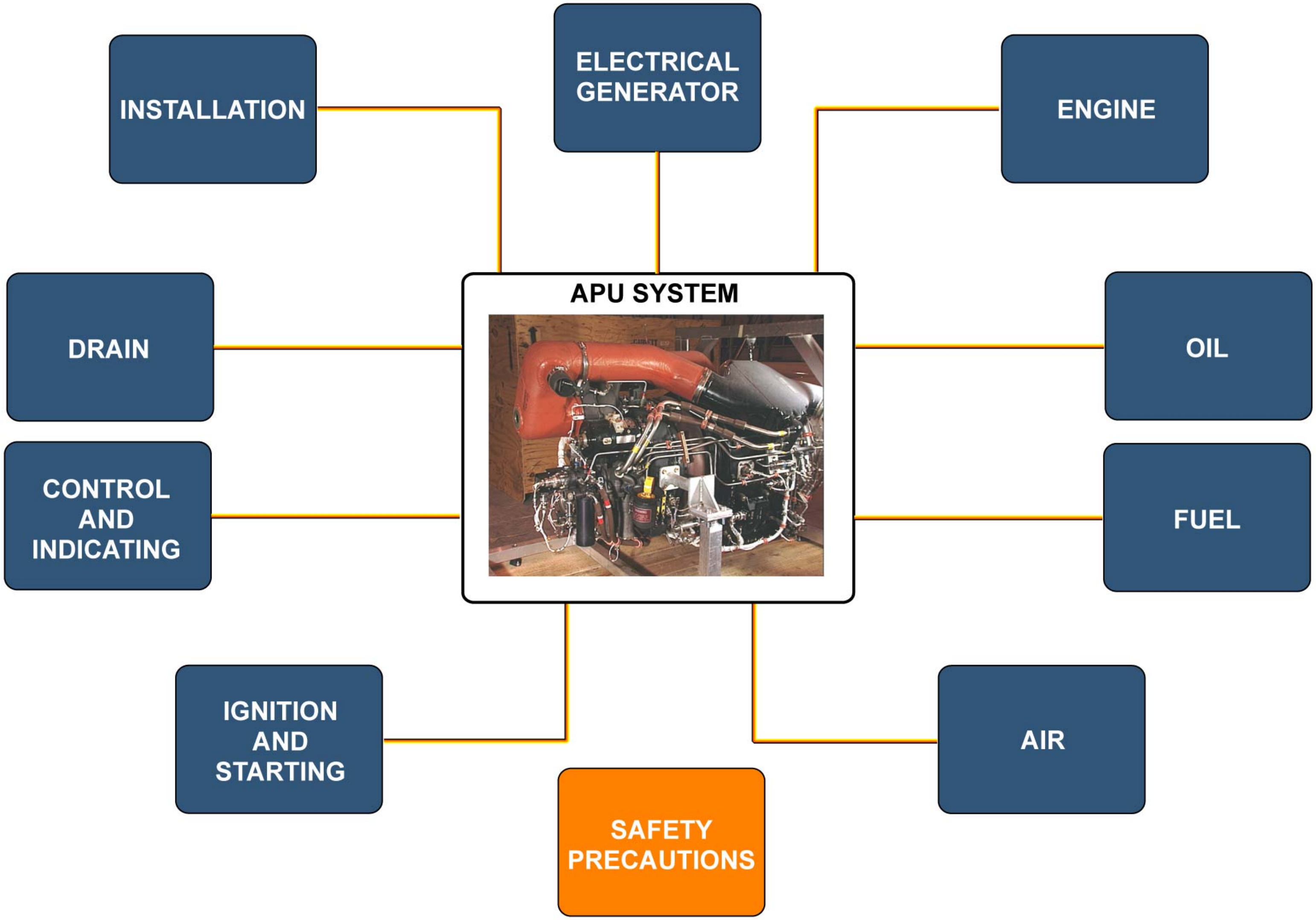
SAFETY PRECAUTIONS

49 APU SYSTEM PRESENTATION (1)

GENERAL

The Auxiliary Power Unit (APU) is a constant-speed gas turbine engine. The APU lets the A/C to operate independently from electrical or pneumatic supply equipment. The main systems of the APU are:
- the APU installation,
- the engine,
- the electrical generator
- the oil system,
- the fuel system,
- the air system,
- the ignition and starting system,
- the control and indicating system,
- the drain system.

When you work on the A/C, you must obey all the safety procedures described in the Aircraft Maintenance Manual (AMM).


INSTALLATION
ELECTRICAL GENERATOR
ENGINE
APU SYSTEM
DRAIN
OIL
CONTROL AND INDICATING
FUEL
IGNITION AND STARTING
AIR
SAFETY PRECAUTIONS

GENERAL

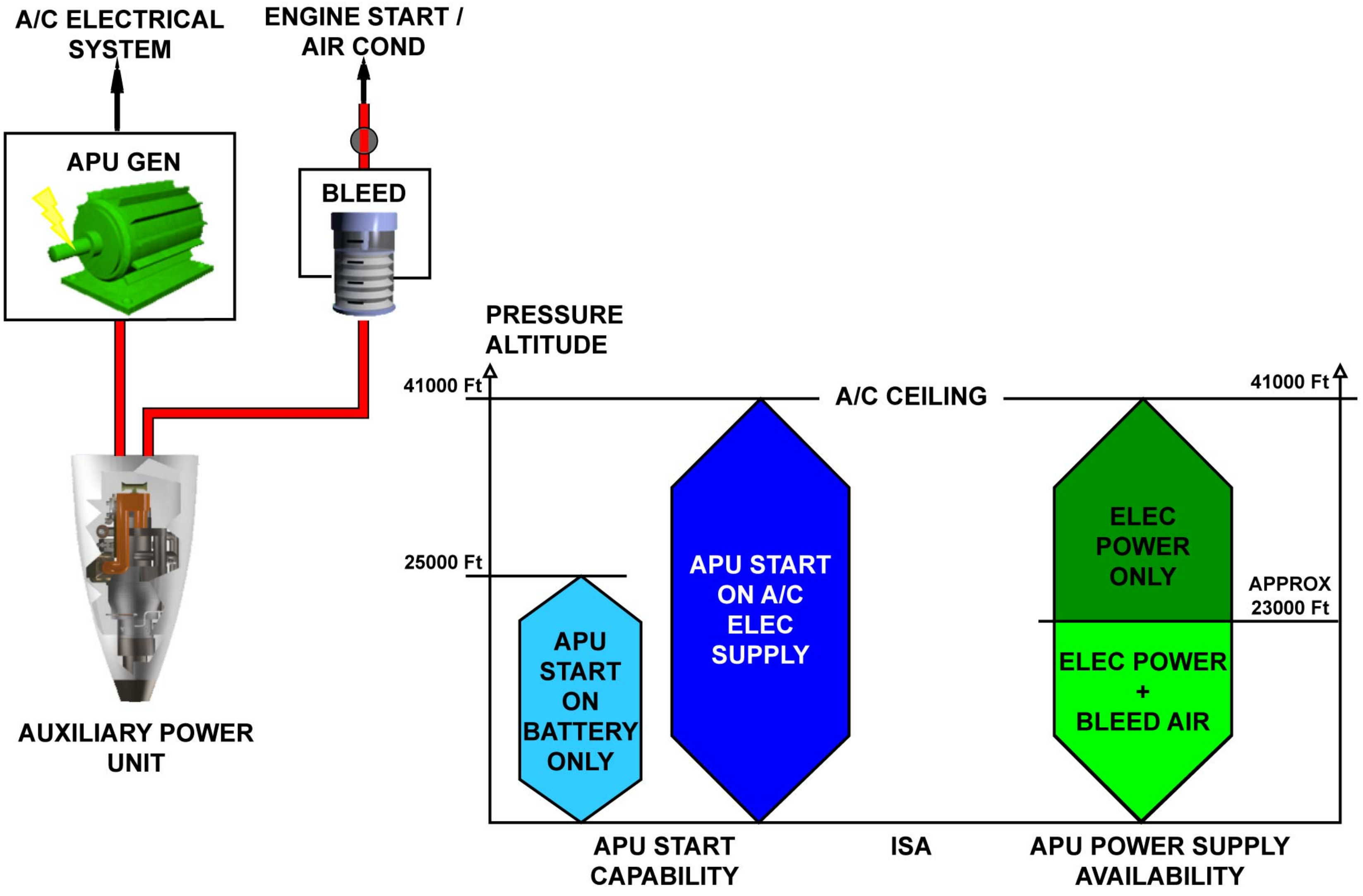
49 APU SYSTEM PRESENTATION (1)

GENERAL (continued)

USERS

The APU is designed to operate throughout the entire flight envelope. Electrical power is available whenever the APU operate, but bleed air is shut off above Flight Level 230 approximately (FL230).

G6B08031 - G10T4T0 - FM49P3000000001



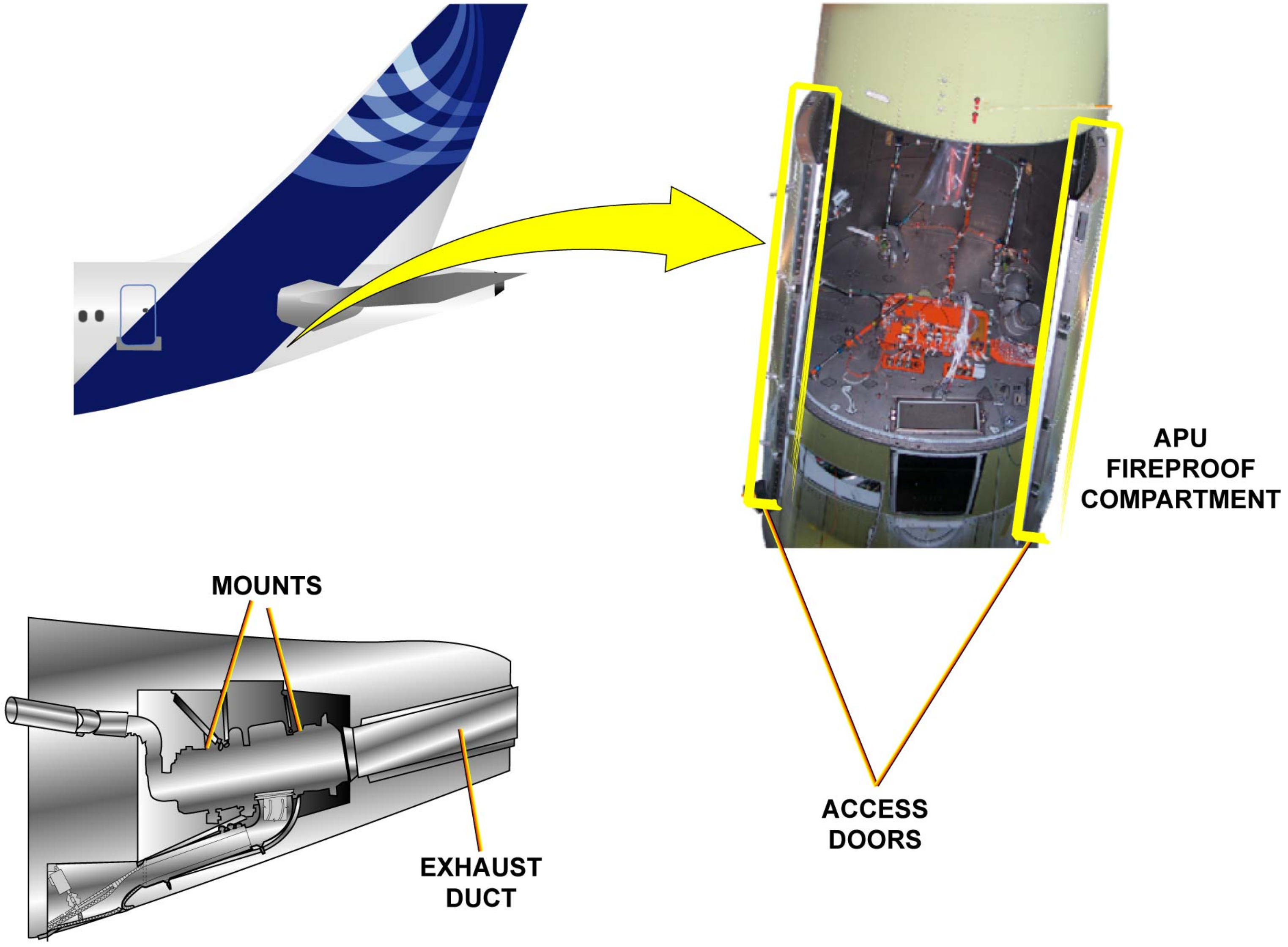
GENERAL - USERS

G6B08031 - G10T4T0 - FM49P3000000001

49 APU SYSTEM PRESENTATION (1)

INSTALLATION

The APU is mounted in a fireproof compartment located in the fuselage tailcone. Two access doors give access to the APU compartment for inspection and maintenance functions. The APU is suspended in its compartment by mounts. An exhaust duct releases the APU gas into the atmosphere.



INSTALLATION

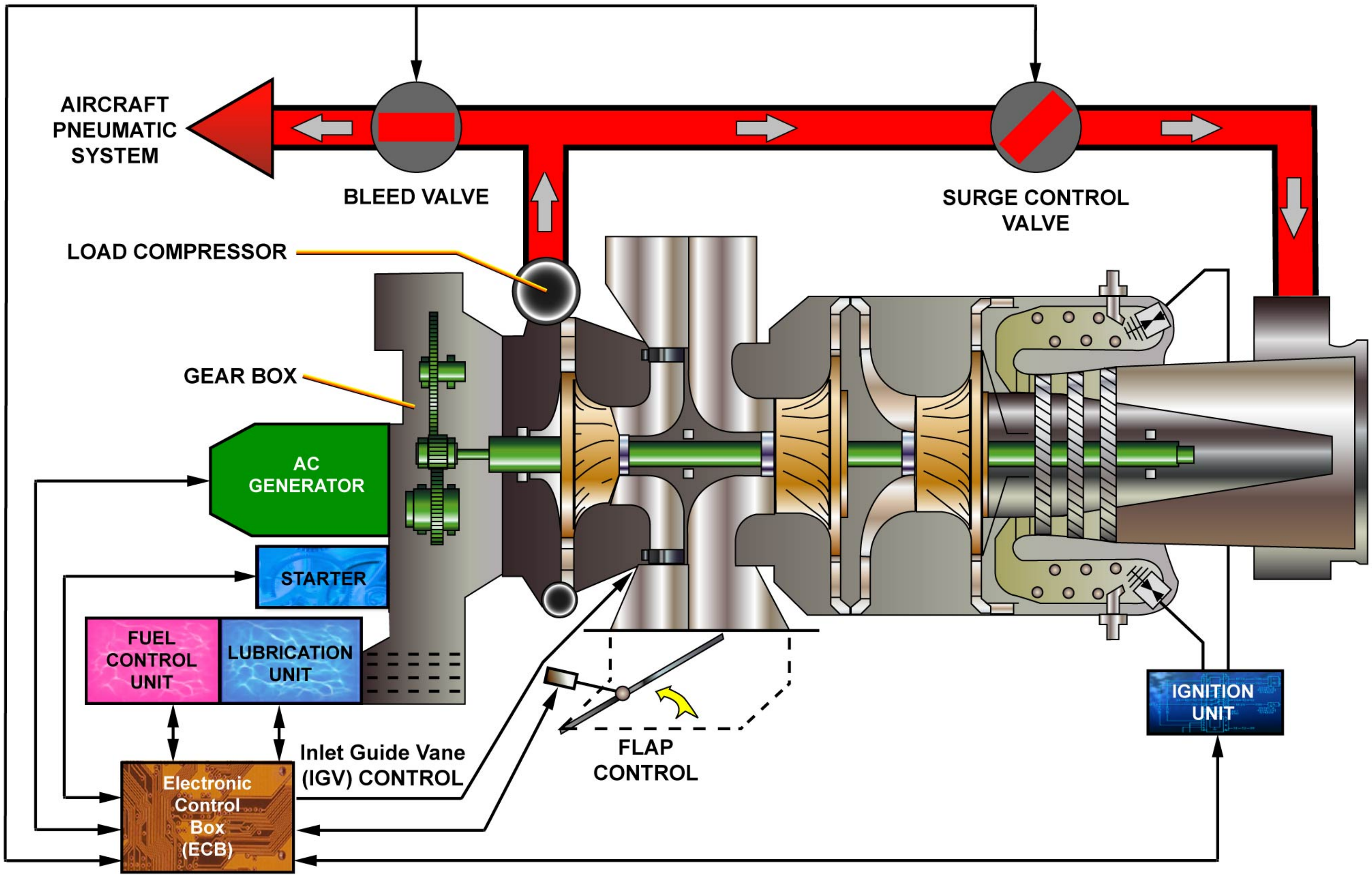
49 APU SYSTEM PRESENTATION (1)

ENGINE

The APU is a constant speed, single shaft gas turbine engine that delivers mechanical shaft power to drive an accessory gearbox and a load compressor. The main components of the accessory gearbox are:
- the starter motor,
- the lubrication module, which drives the Fuel Control Unit (FCU),
- the AC generator.

The APU operation is controlled and monitored by the Electronic Control Box (ECB). The ECB has full authority over the following APU functions:
- starting,
- acceleration,
- speed governing,
- indication,
- fault monitoring,
- interface with A/C systems.

The air intake flap lets external air supply the APU inlet plenum. It cuts off the air supply when the APU does not operate. The APU bleed air system includes a bleed valve, a flow regulation with the Inlet Guide Vane (IGV) and surge protection by a surge control valve. The ECB fulfills the control and monitoring of these components. During starting, the electrical starter motor drives the APU and the initial combustion is initiated by the ignition system.


AIRCRAFT PNEUMATIC SYSTEM
BLEED VALVE
SURGE CONTROL VALVE
LOAD COMPRESSOR
GEAR BOX
AC GENERATOR
STARTER
FUEL CONTROL UNIT
LUBRICATION UNIT
Inlet Guide Vane (IGV) CONTROL
FLAP CONTROL
IGNITION UNIT
Electronic Control Box (ECB)

ENGINE

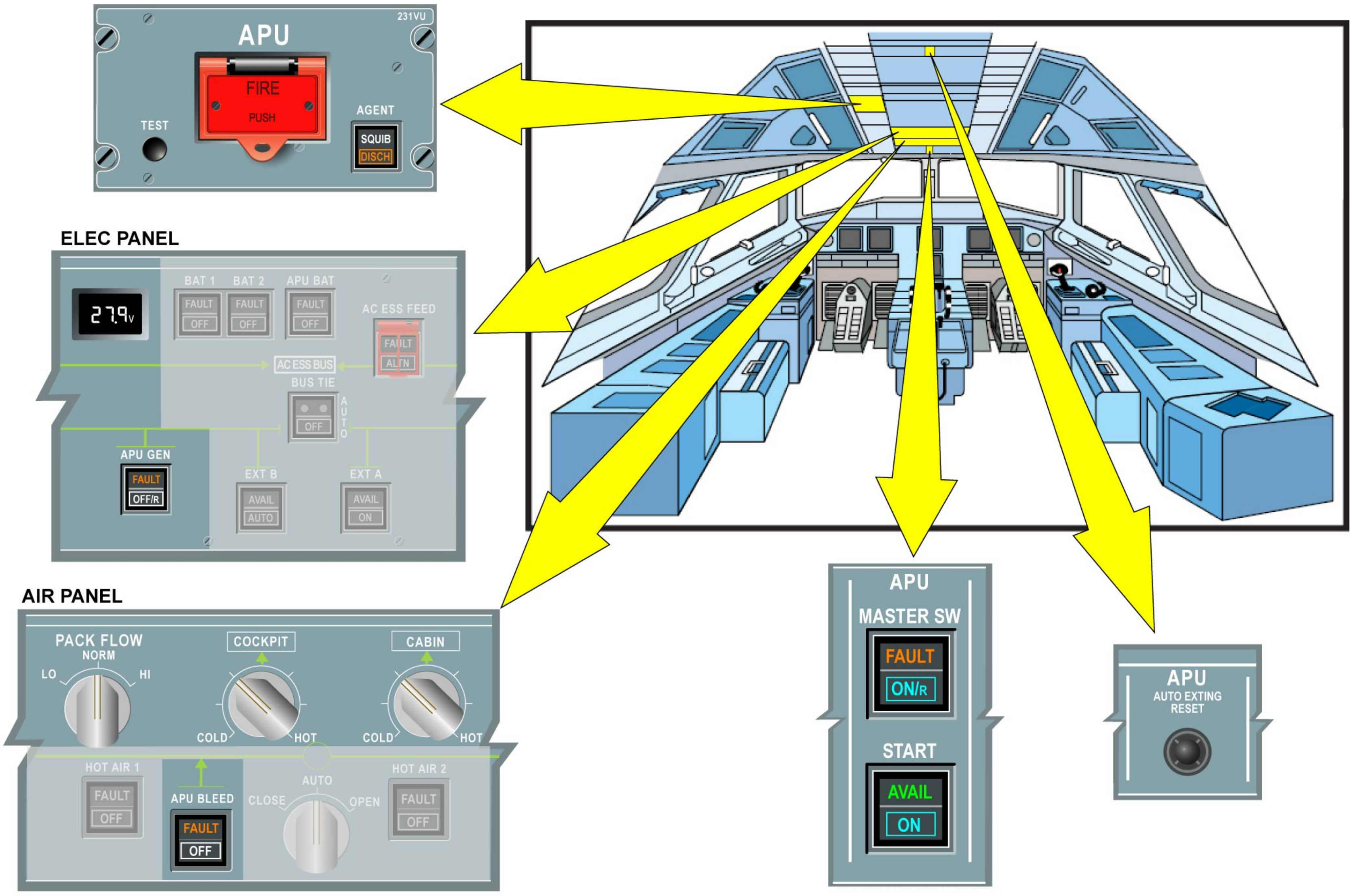
49 APU SYSTEM PRESENTATION (1)

CONTROL AND INDICATING

This section will highlight the control panels and indications for the APU.

CONTROL PANELS

The controls used to operate the APU are:
- the APU MASTER SWitch and START P/BSW, on the APU control panel,
- the APU fire controls, on the APU fire panel.



CONTROL AND INDICATING - CONTROL PANELS

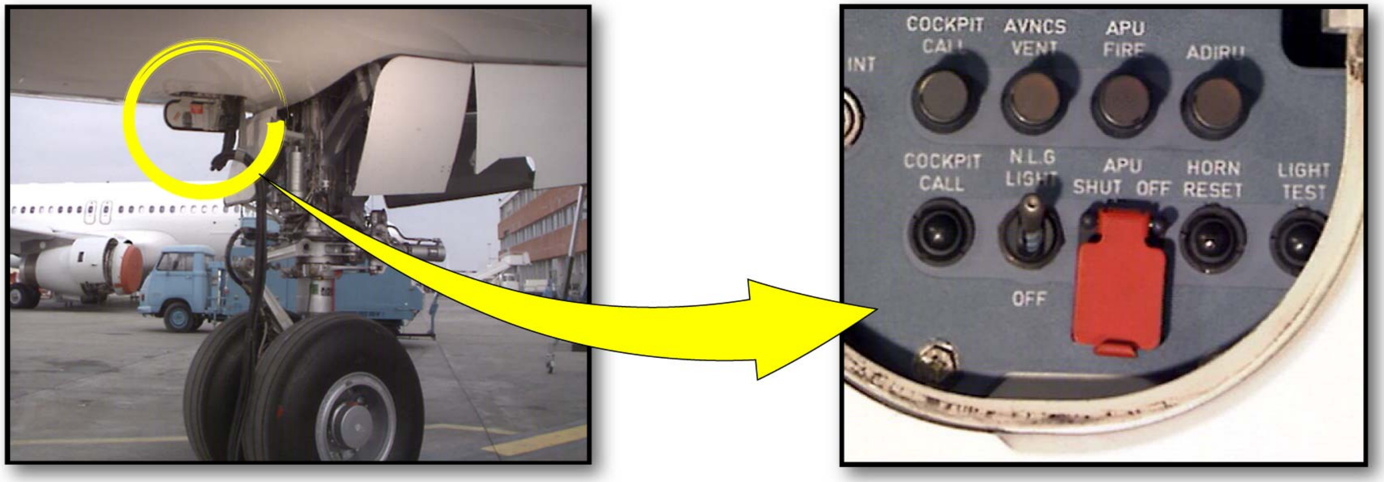
49 APU SYSTEM PRESENTATION (1)

CONTROL AND INDICATING (continued)

EXTERNAL CONTROLS

It is possible to do an emergency shut down of the APU from either the REFUEL/DEFUEL panel or the EXTERNAL PWR panel by lifting the guard and pushing either the APU EMERGENCY P/BSW or the APU SHUT OFF P/BSW.

REFUEL/DEFUEL PANEL



EXTERNAL POWER PANEL

CONTROL AND INDICATING - EXTERNAL CONTROLS

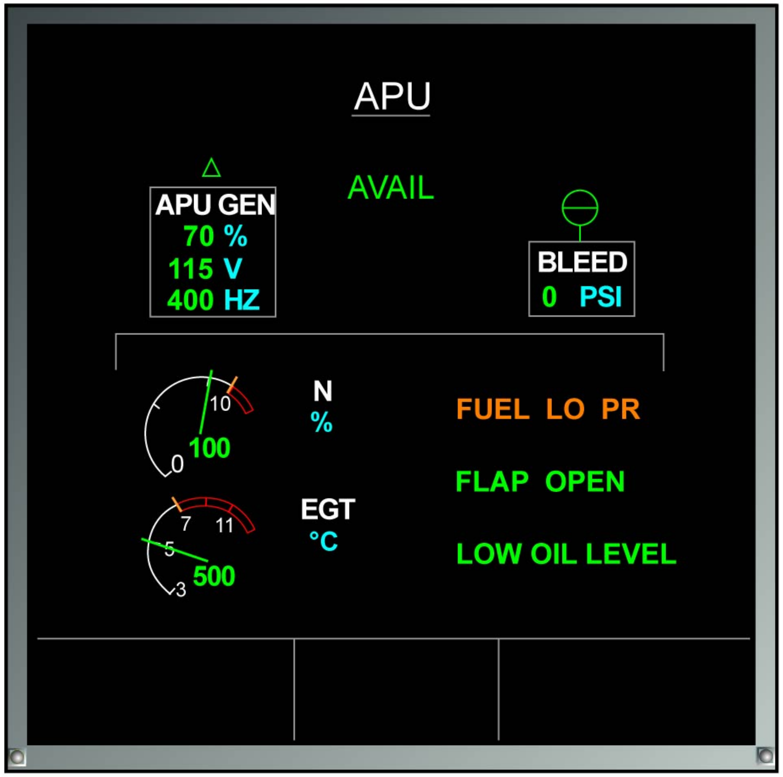
49 APU SYSTEM PRESENTATION (1)

CONTROL AND INDICATING (continued)

ECAM APU PAGE

APU parameters are displayed on the ECAM APU page. The APU generator parameters are duplicated on the ECAM ELEC page and the APU pneumatic parameters are duplicated on the ECAM BLEED page.

THE DU SHOW ALL INDICATIONS AVAILABLE BUT NOT A SYSTEM CONFIGURATION.



SYSTEM DISPLAY (SD)

APU ECAM PAGE

CONTROL AND INDICATING - ECAM APU PAGE

49 APU SYSTEM PRESENTATION (1)

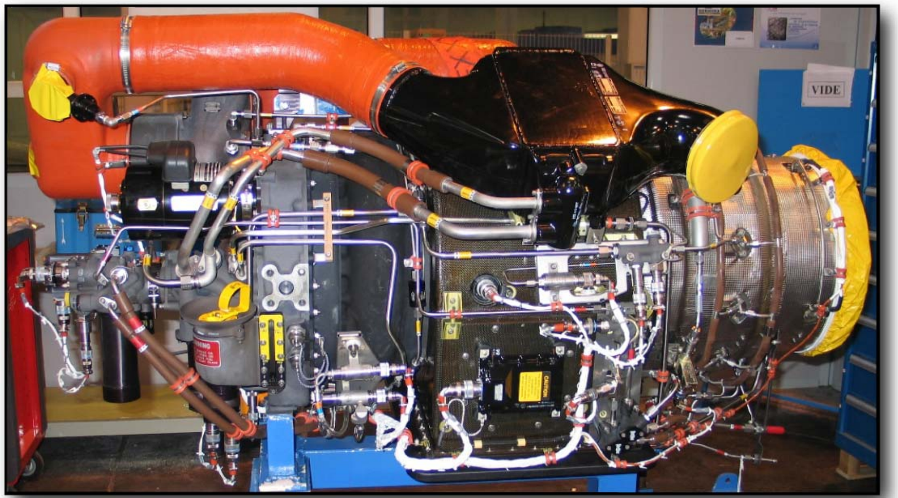
COMPONENT LOCATION

The APU is installed in the tail section of the fuselage.

ENGINE VIEW

The left and right hand sides of the APU are shown.

G6B08031 - G10T4T0 - FM49P3000000001



APU LEFT SIDE

APU RIGHT SIDE

COMPONENT LOCATION - ENGINE VIEW

G6B08031 - G10T4T0 - FM49P3000000001

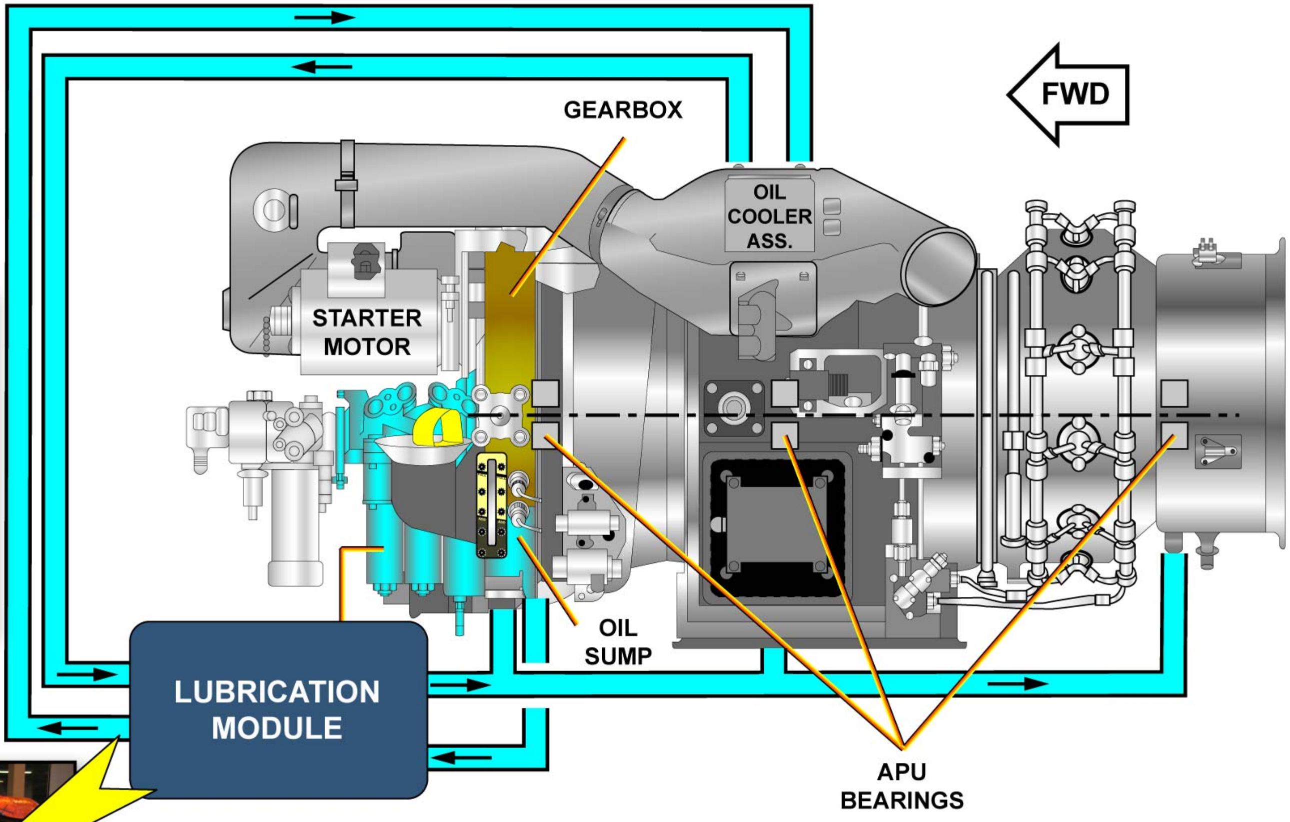
49 APU SYSTEM PRESENTATION (1)

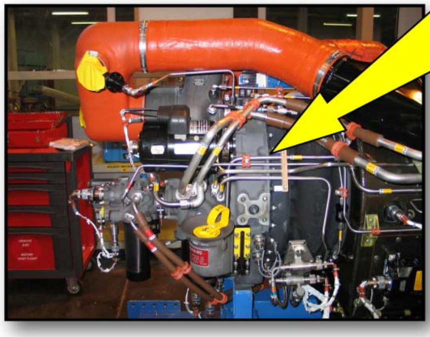
COMPONENT LOCATION (continued)

OIL

The oil, contained in the gearbox sump, is used to lubricate, to clean and to cool the APU bearings and the accessory gearbox. The oil cools and lubricates the gearbox mounted AC generator. The oil system has a lubrication module for distribution, filtration, scavenging, and oil cooler.

The AC GENERATOR is located on the opposite side behind the STARTER MOTOR.





COMPONENT LOCATION - OIL

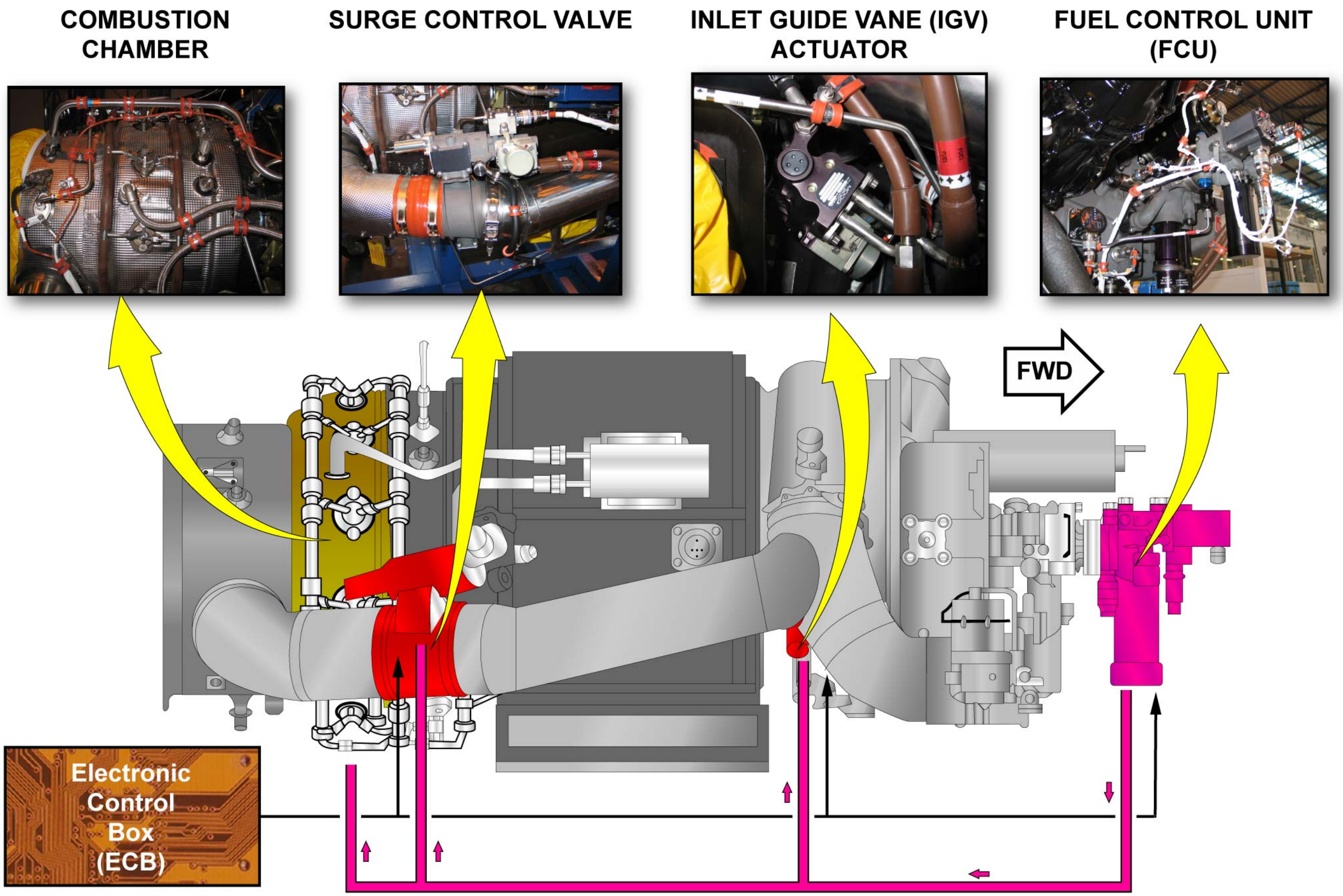
G6B08031 - G10T4T0 - FM49P3000000001

49 APU SYSTEM PRESENTATION (1)

COMPONENT LOCATION (continued)

FUEL

The FCU is the main component of the APU fuel system. It supplies fuel from the APU fuel feed line to the power section (combustion chamber). Fuel pressure is also used as muscle pressure to operate two APU components:
- the load compressor IGV,
- the surge control valve for air regulation,
- the ECB computes the fuel/air ratio, related to the APU load, and meters the fuel flow accordingly.



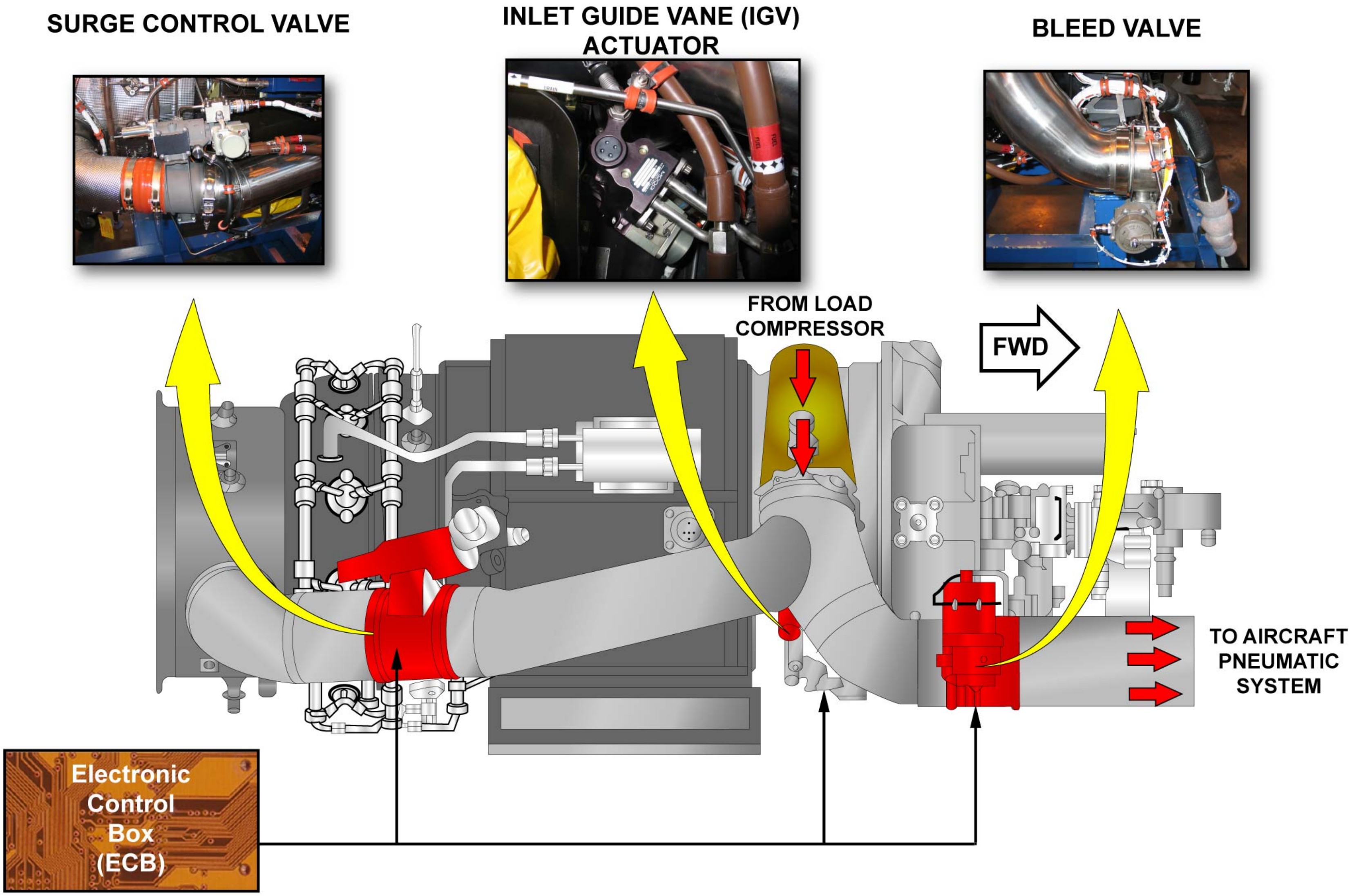
COMPONENT LOCATION - FUEL

49 APU SYSTEM PRESENTATION (1)

COMPONENT LOCATION (continued)

AIR

The main role of the APU air system is to supply pressurized air to the A/C pneumatic system. This is achieved by the APU load compressor. The ECB controls and operates the bleed valve for air supply. The ECB also controls and operates the IGVs for flow regulation, and the surge control valve for surge protection.



COMPONENT LOCATION - AIR

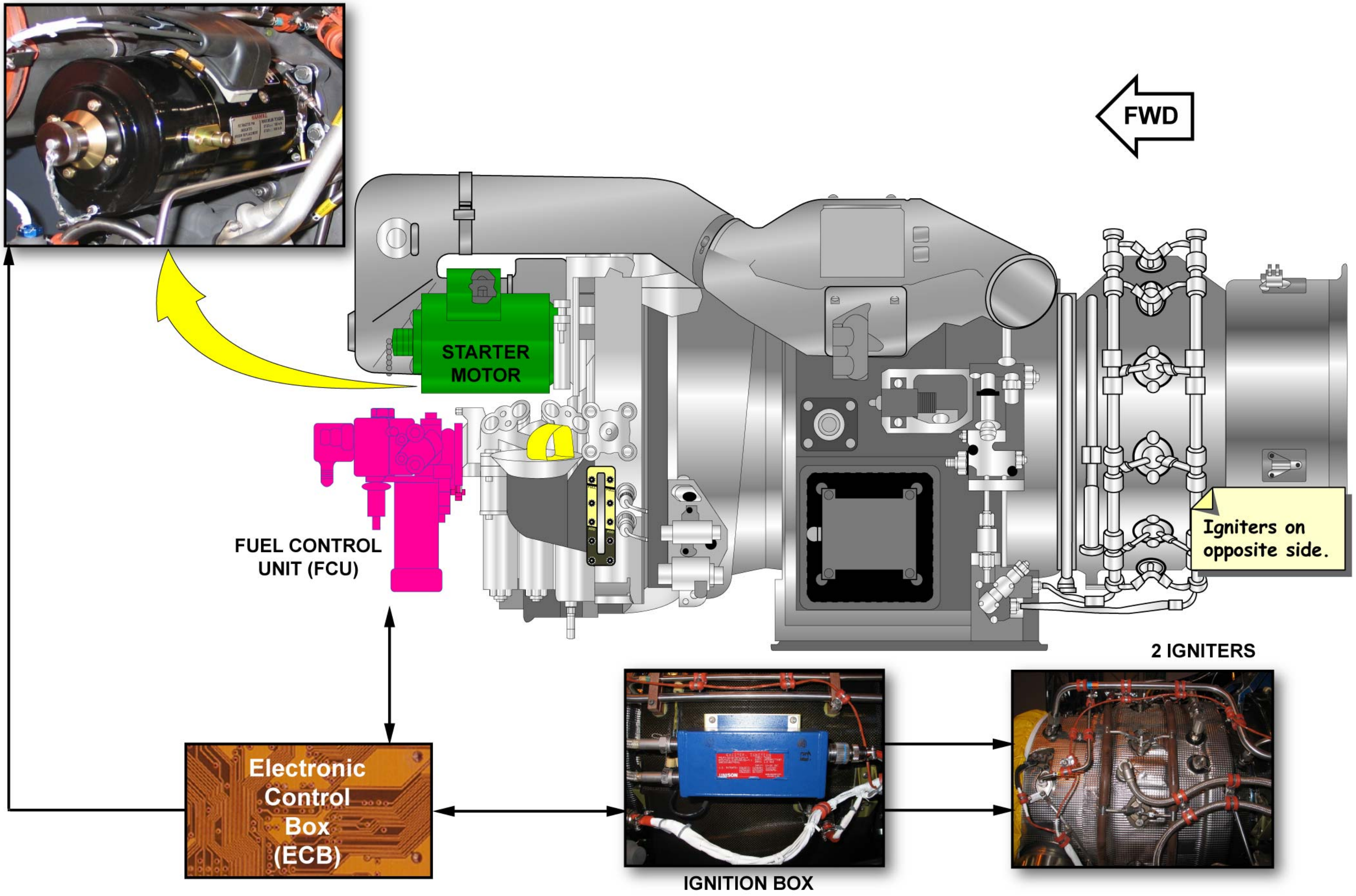
49 APU SYSTEM PRESENTATION (1)

COMPONENT LOCATION (continued)

IGNITION AND STARTING

The APU start sequence is initiated from the cockpit and is controlled by the ECB. During starting, the electrical starter motor drives the APU and the initial combustion is initiated by the ignition system.

G6B08031 - G10T4T0 - FM49P3000000001



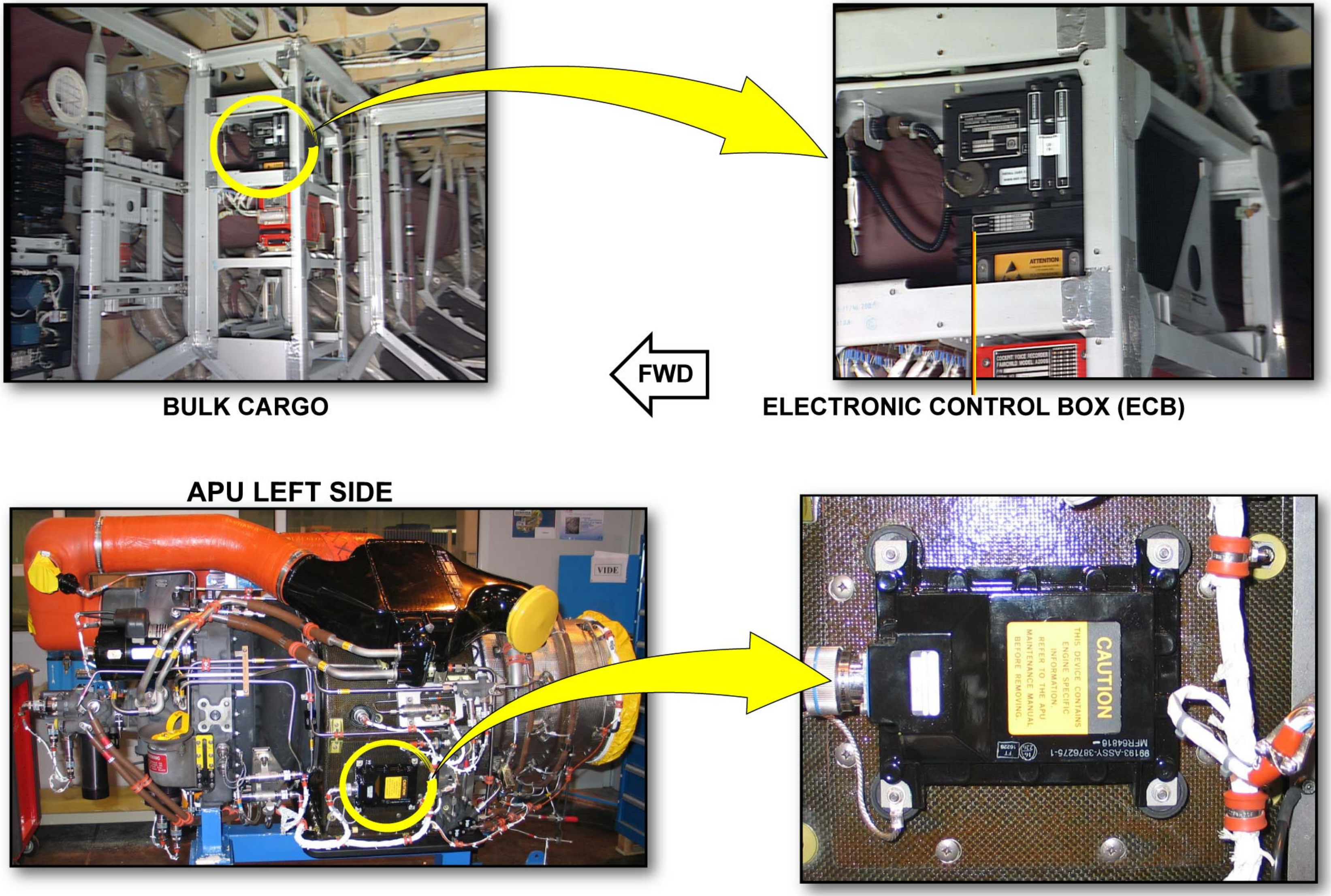
COMPONENT LOCATION - IGNITION AND STARTING

49 APU SYSTEM PRESENTATION (1)

COMPONENT LOCATION (continued)

ECB

The ECB is in the bulk cargo compartment on the Right Hand side. A Data Memory Module (DMM) is installed on the Left Hand side of the APU.



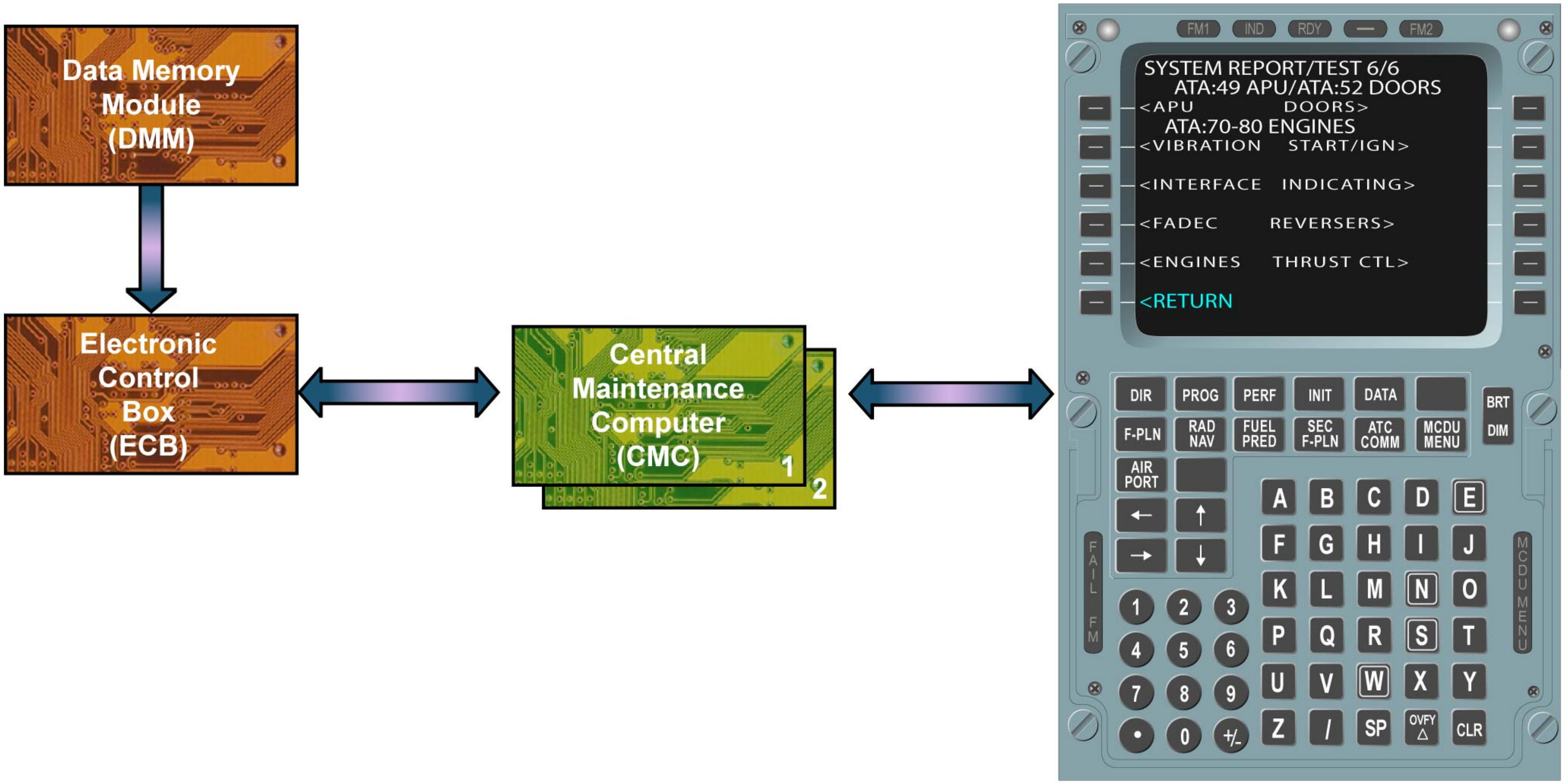
COMPONENT LOCATION - ECB

G6B08031 - G10T4T0 - FM49P3000000001

49 APU SYSTEM PRESENTATION (1)

MAINTENANCE/TEST FACILITIES

The Central Maintenance Computers (CMCs) let the maintenance crew analyze failure data present in the ECB BITE via the Multipurpose Control & Display Units (MCDUs).



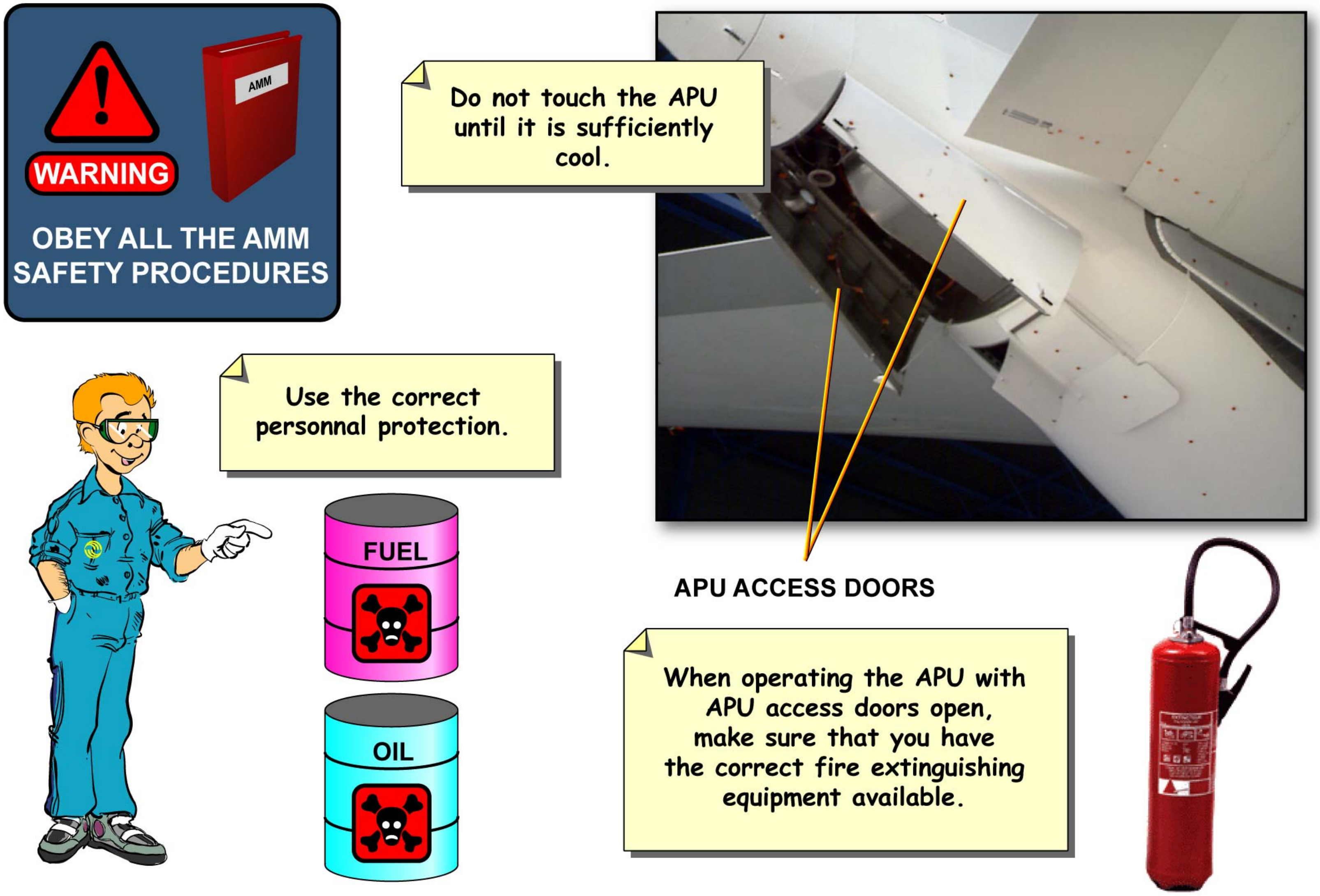
MAINTENANCE/TEST FACILITIES

G6B08031 - G10T4T0 - FM49P3000000001

49 APU SYSTEM PRESENTATION (1)

SAFETY PRECAUTIONS

When you work on A/C, make sure that you obey all the AMM safety procedures. This will prevent injury to persons and/or damage to the A/C. Here is an overview of the main safety precautions relative to the APU system. Make sure that you use the correct personal protection when you work on the APU, as fuel and oil are poisonous.
Do not touch the APU until it is sufficiently cool. If you operate the APU with the APU access doors open or removed, make sure that you have the correct fire fighting equipment available. The onboard APU fire extinguishing system is not sufficient when these doors are not closed.



SAFETY PRECAUTIONS

G6B08031 - G10T4T0 - FM49P3000000001

49 APU SYSTEM PRESENTATION (1)

ENVIRONMENTAL PRECAUTIONS

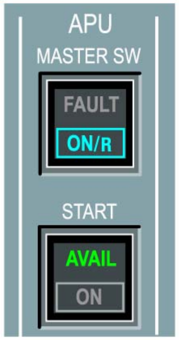
Do not discharge products such as oil, fuel, solvent, lubricant either in trash bins, soil or into the water network (drains, gutters, rain water, waste water, etc...).
Sort waste fluids and use specific waste disposal containers.
Each product must be stored in an appropriate and specific cabinet or room such as a fire-resistant and sealed cupboard.
Avoid use of the APU if APU BLEED air is not necessary. Turn-off unused ground service equipment (GPU, Air conditioning cart, etc...) if no work is being done or nobody is present on the aircraft.

STORE PRODUCTS IN APPROPRIATE CONTAINER/CUPBOARD/ROOM

SORT WASTE FLUIDS IN CONTAINERS

AVOID FLUID SPILLAGE
USE APPROPRIATE STORAGE EQUIPMENT FOR CHEMICAL PRODUCTS
LIMIT AIR POLLUTION (EXHAUST SMOKE, GAS EMISSIONS...)

FLUID SPILL CLEANUP KIT



USE SPECIFIC WASTE DISPOSAL CONTAINERS

ENVIRONMENTAL PRECAUTIONS

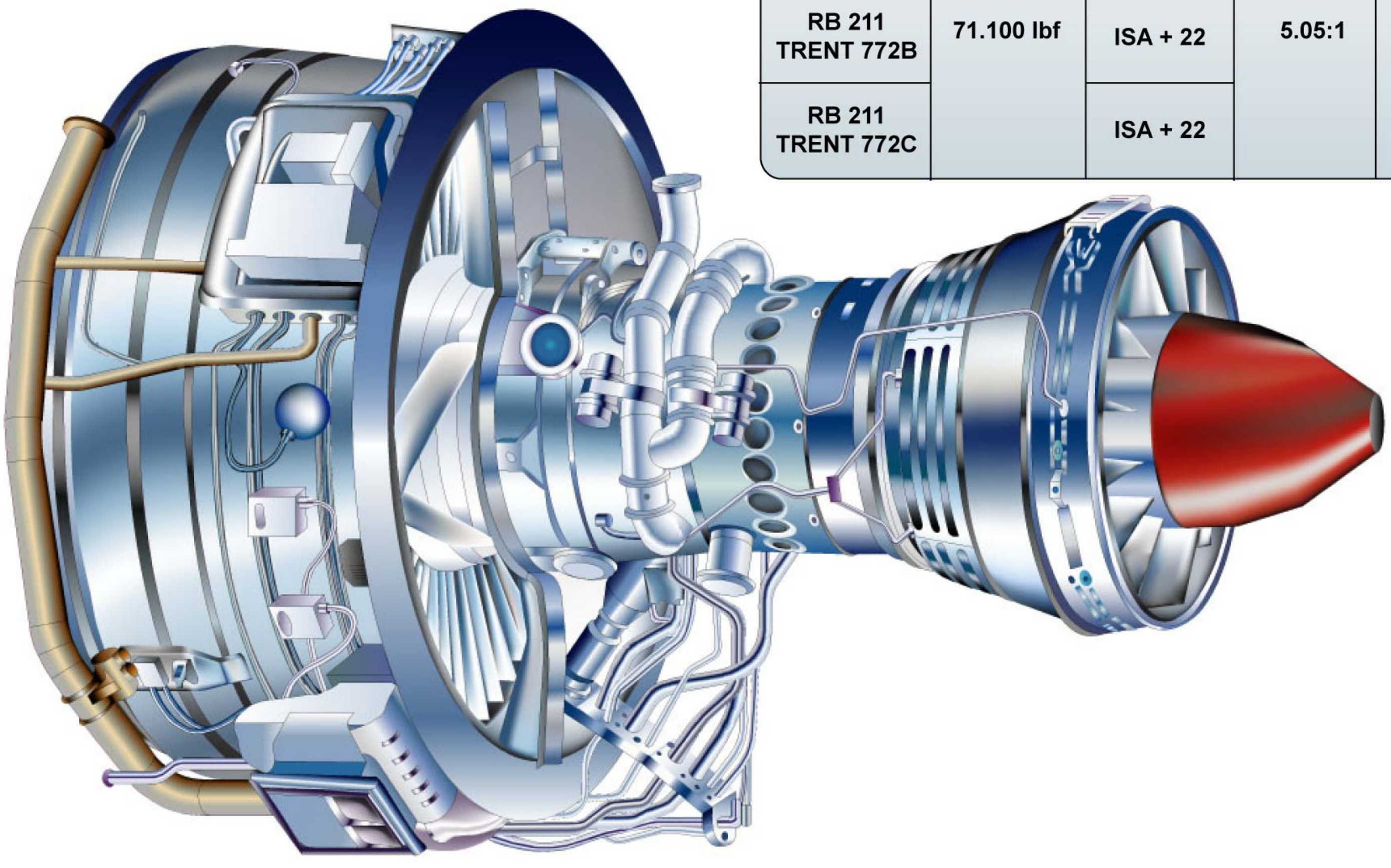
70 POWER PLANT RR TRENT 700 PRESENTATION (1)

POWERPLANT INTRODUCTION

The Rolls-Royce RB211-Trent 772 series engine is an axial flow, triple spool, high bypass-ratio, turbo-fan engine. The RR RB-211Trent 772 powers the A330 aircraft and produces approximately 71.000 lbf. of thrust.

G6B08031 - G10T4T0 - FM70PB000000071

ENGINE	MAX THRUST RATING	FLAT RATED TEMP	BYPASS RATIO	DRY WEIGHT
RB 211 TRENT 772		ISA + 15		
RB 211 TRENT 772B	71.100 lbf	ISA + 22	5.05:1	6 160 Kg (13.580 lb)
RB 211 TRENT 772C		ISA + 22		



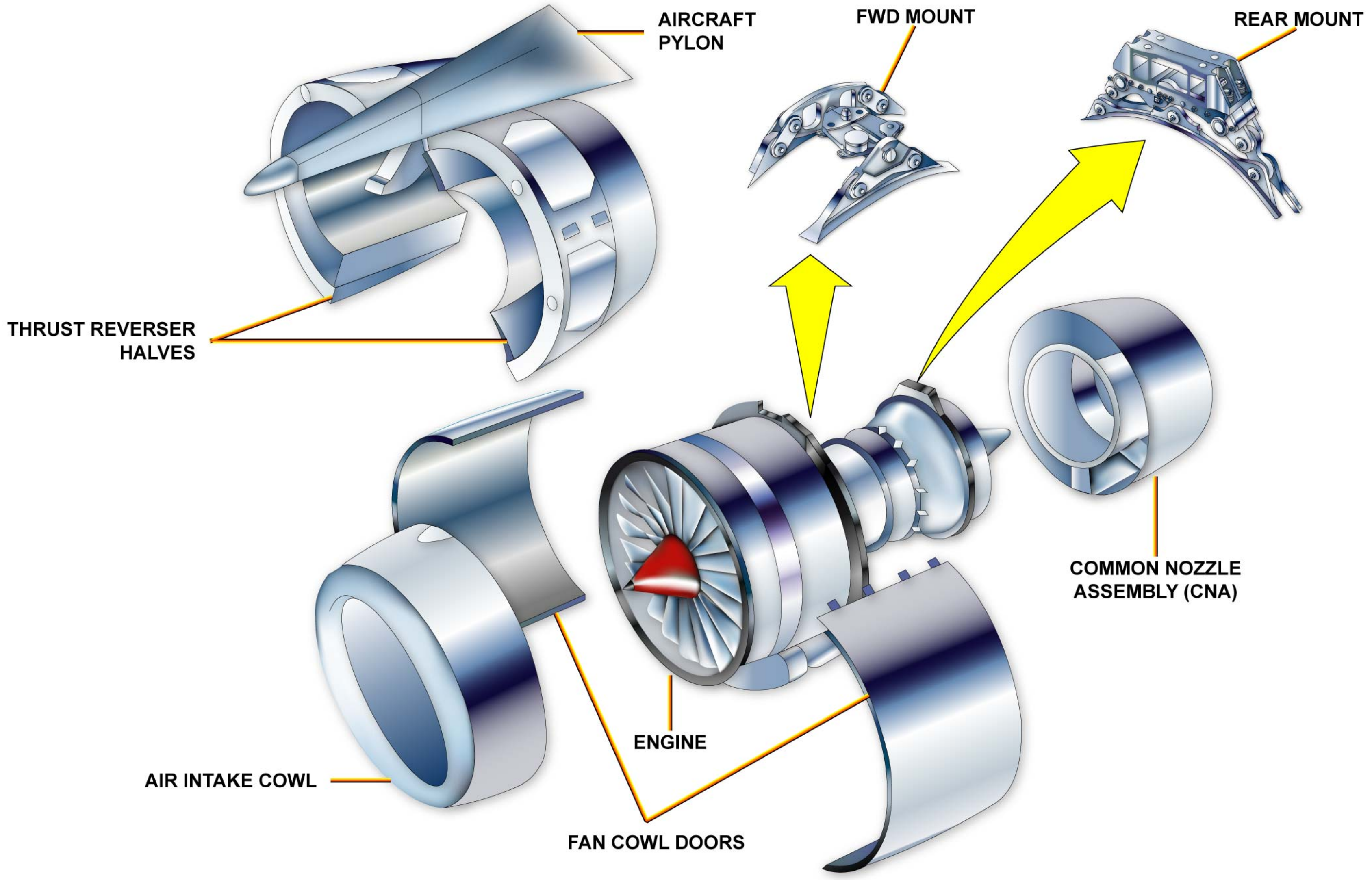
POWERPLANT INTRODUCTION

G6B08031 - G10T4T0 - FM70PB000000071

70 POWER PLANT RR TRENT 700 PRESENTATION (1)

POWERPLANT INSTALLATION

The powerplant installation includes the engine inlet, the engine assembly, the exhaust common nozzle assembly, the fan cowls and thrust reverser assemblies. The FORWARD and AFT engine mounts attach the engine to the aircraft pylon and support the weight of the engine and transmit thrust loads to the aircraft structure.

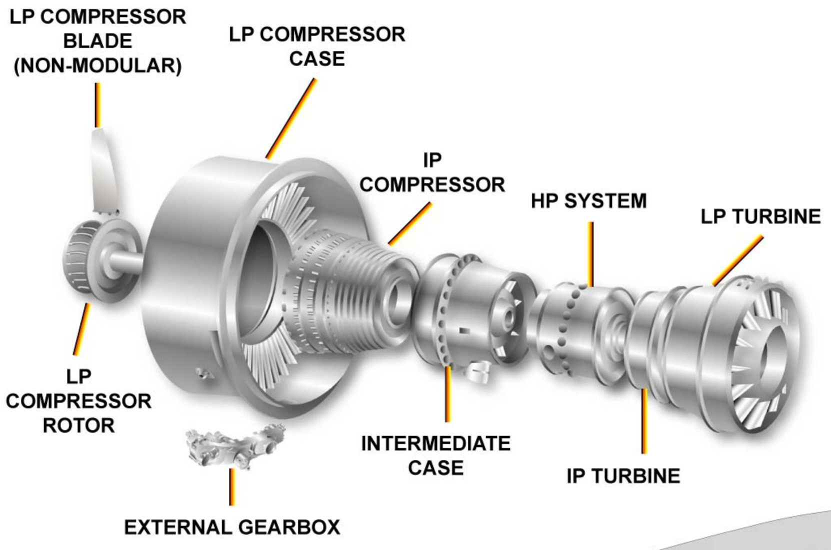


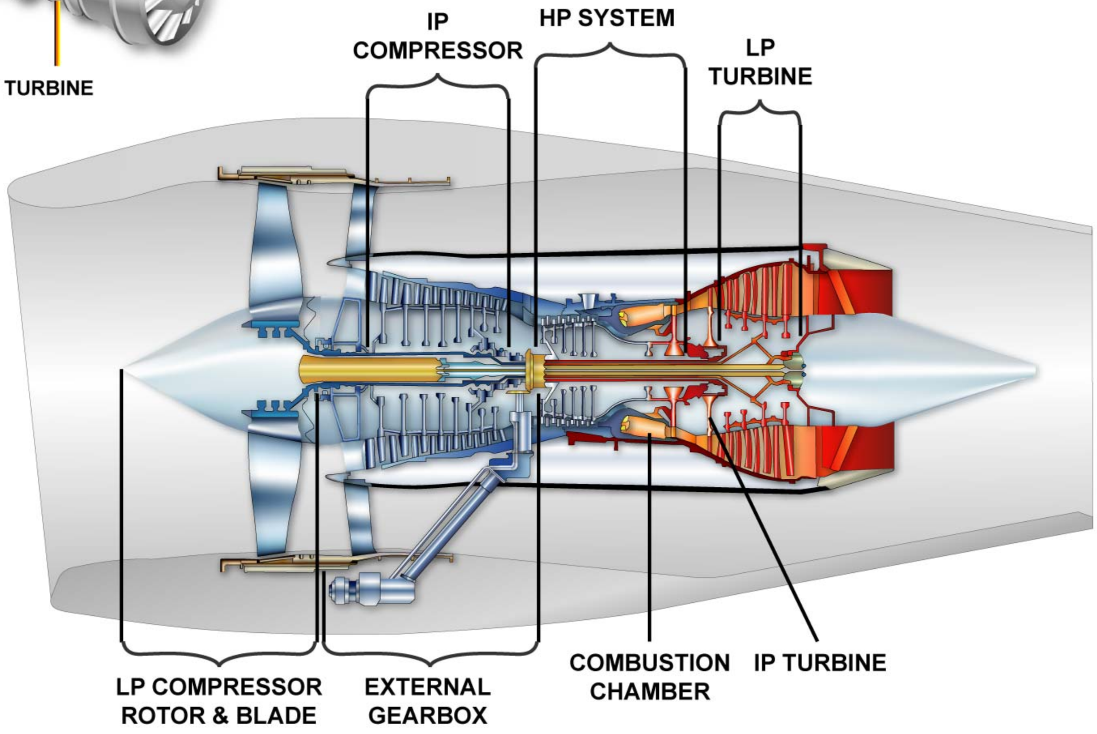
POWERPLANT INSTALLATION

70 POWER PLANT RR TRENT 700 PRESENTATION (1)

MODULAR ENGINE DESIGN

The RR RB-211Trent 772 is designed using a modular concept. The modules may be replaced independently to reduce the time required to return the engine into service. The modules are:
- module 01: LP compressor rotor,
- module 02: IP (Intermediate Pressure) compressor,
- module 03: Intermediate case,
- module 04: HP system (this includes the HP compressor, the combustion system and the HP turbine),
- module 05: IP turbine,
- module 06: External gearbox,
- module 07: LP compressor case,
- module 08: LP turbine.





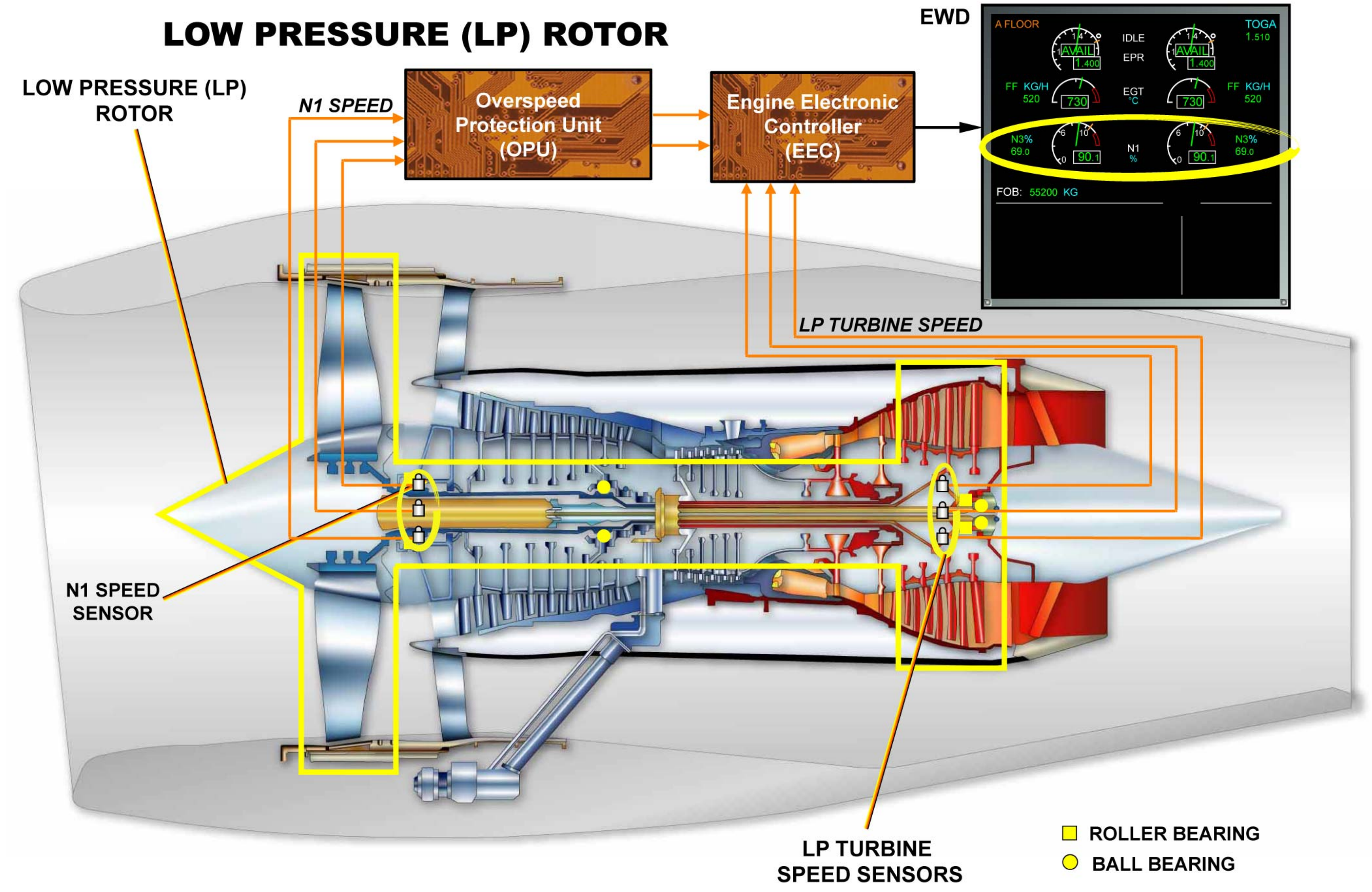
MODULAR ENGINE DESIGN

70 POWER PLANT RR TRENT 700 PRESENTATION (1)

MODULAR ENGINE DESIGN (continued)

LP ROTOR

The LP rotor has the forward fan and the LP shaft, all driven by the 4-stage LP turbine. The speed of the LP rotor is indicated on ECAM as N1. The forward fan supplies most of the engine thrust. The air produced by the fan is known as secondary airflow or bypass airflow. The air, which goes through the engine core for combustion is the primary airflow. The LP (fan) compressor case features a Kevlar containment band designed to protect the fuselage by helping to prevent any fan blade damage within the nacelle.
The LP Turbine Case is the location for the rear engine mount. The LP rotor is supported by 2 ball and 2 roller bearings, which are lubricated and cooled.



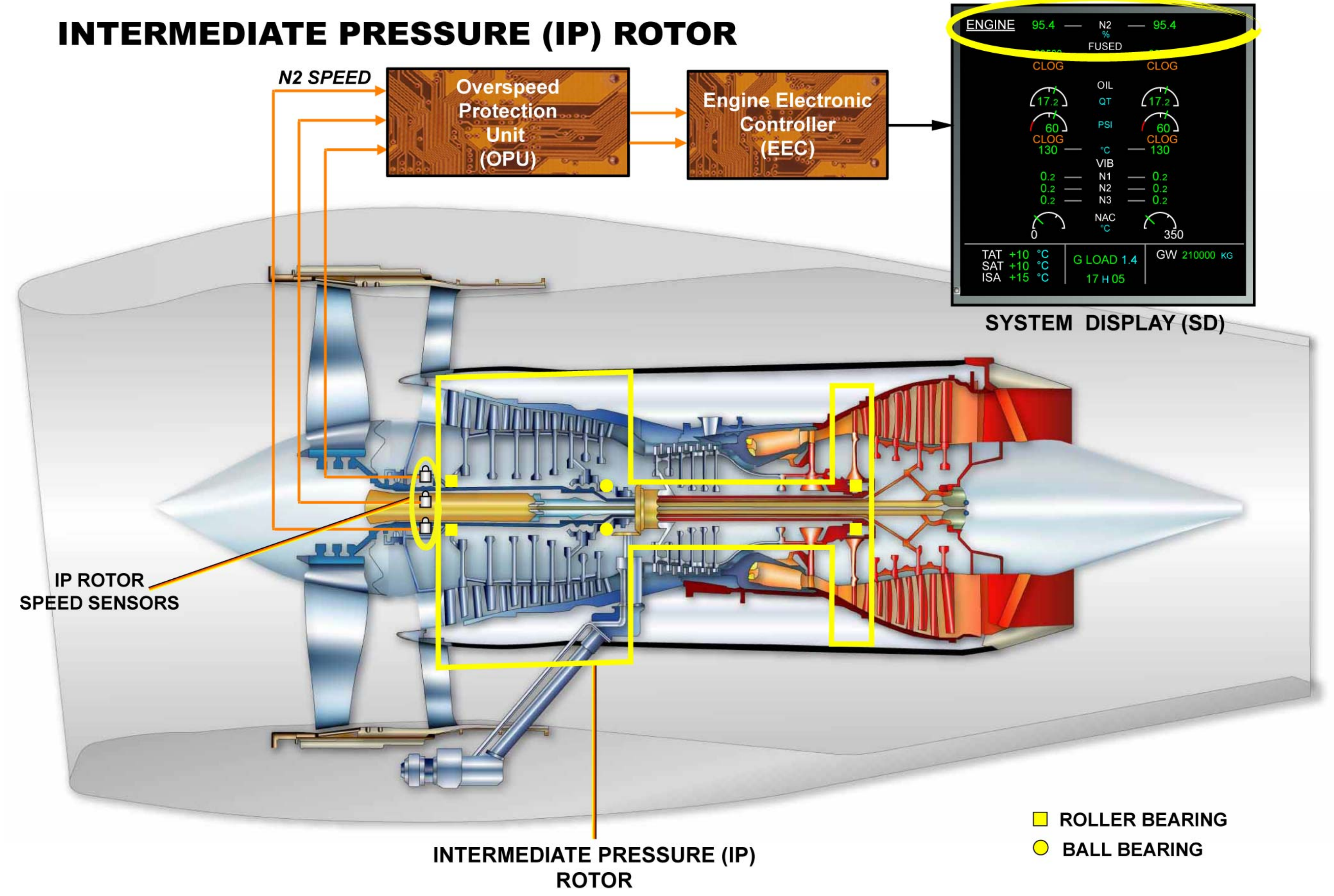
MODULAR ENGINE DESIGN - LP ROTOR

70 POWER PLANT RR TRENT 700 PRESENTATION (1)

MODULAR ENGINE DESIGN (continued)

IP ROTOR

The IP rotor has an 8-stage IP compressor driven by a single-stage IP turbine. The IP compressor supplies primary airflow to the high-pressure compressor for combustion. The speed of the IP rotor is indicated on the ECAM as N2.
1 ball and 2 roller bearings support the IP rotor and are lubricated and cooled. The Intermediate case is the location for the forward engine mount.



MODULAR ENGINE DESIGN - IP ROTOR

G6B08031 - G10T4T0 - FM70PB000000071

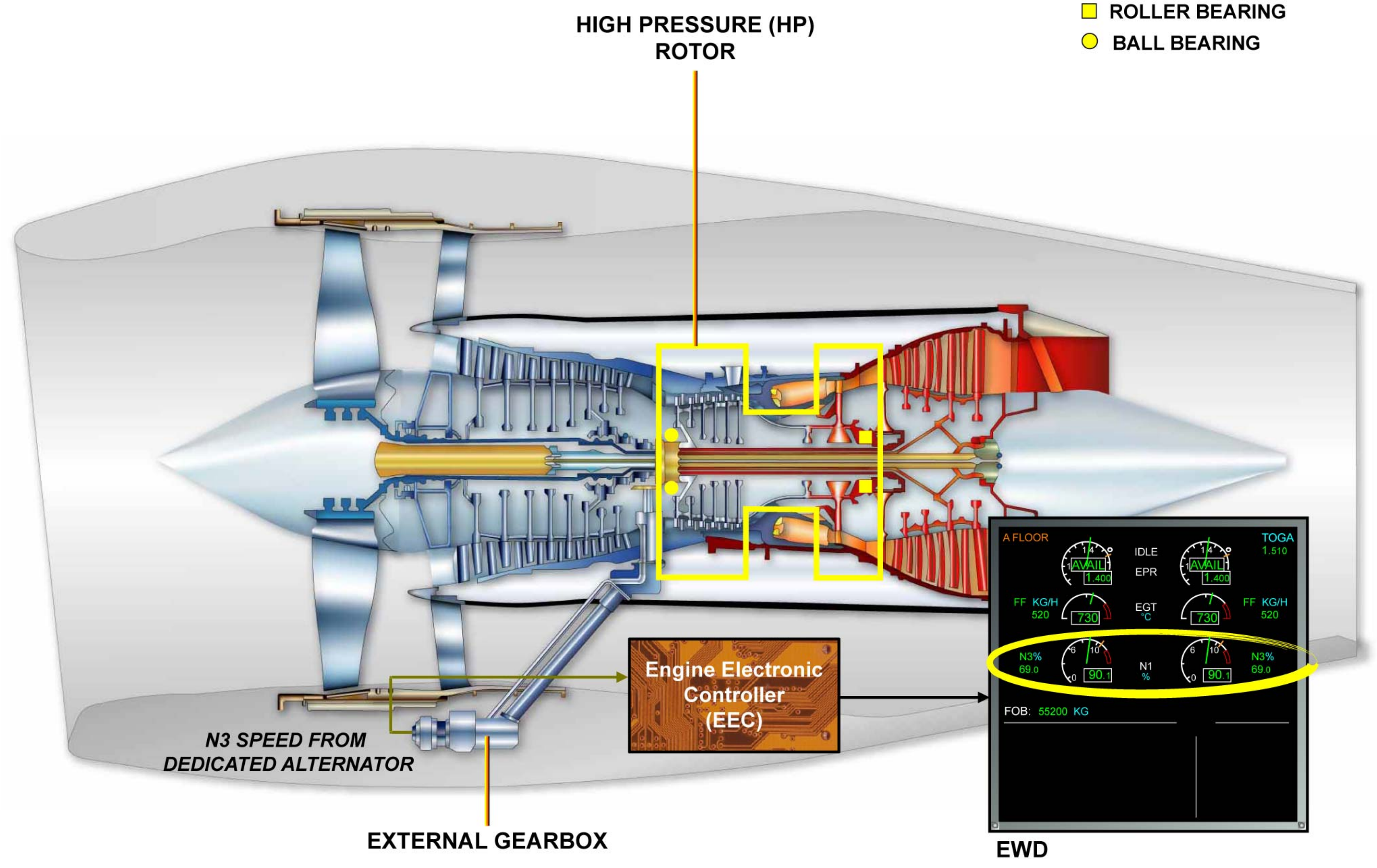
70 POWER PLANT RR TRENT 700 PRESENTATION (1)

MODULAR ENGINE DESIGN (continued)

HP ROTOR

The HP rotor is made of a 6-stage HP compressor driven by a single-stage HP turbine. The HP compressor is also the source of customer bleed air. The speed of the HP rotor is indicated on the ECAM as N3. The HP rotor is supported by 1 ball and 1 roller bearing, which are lubricated and cooled.
The annular combustion chamber is installed between the HP compressor and HP turbine. It has ports for 24 fuel nozzles and 2 igniter plugs.

HIGH PRESSURE (HP) ROTOR



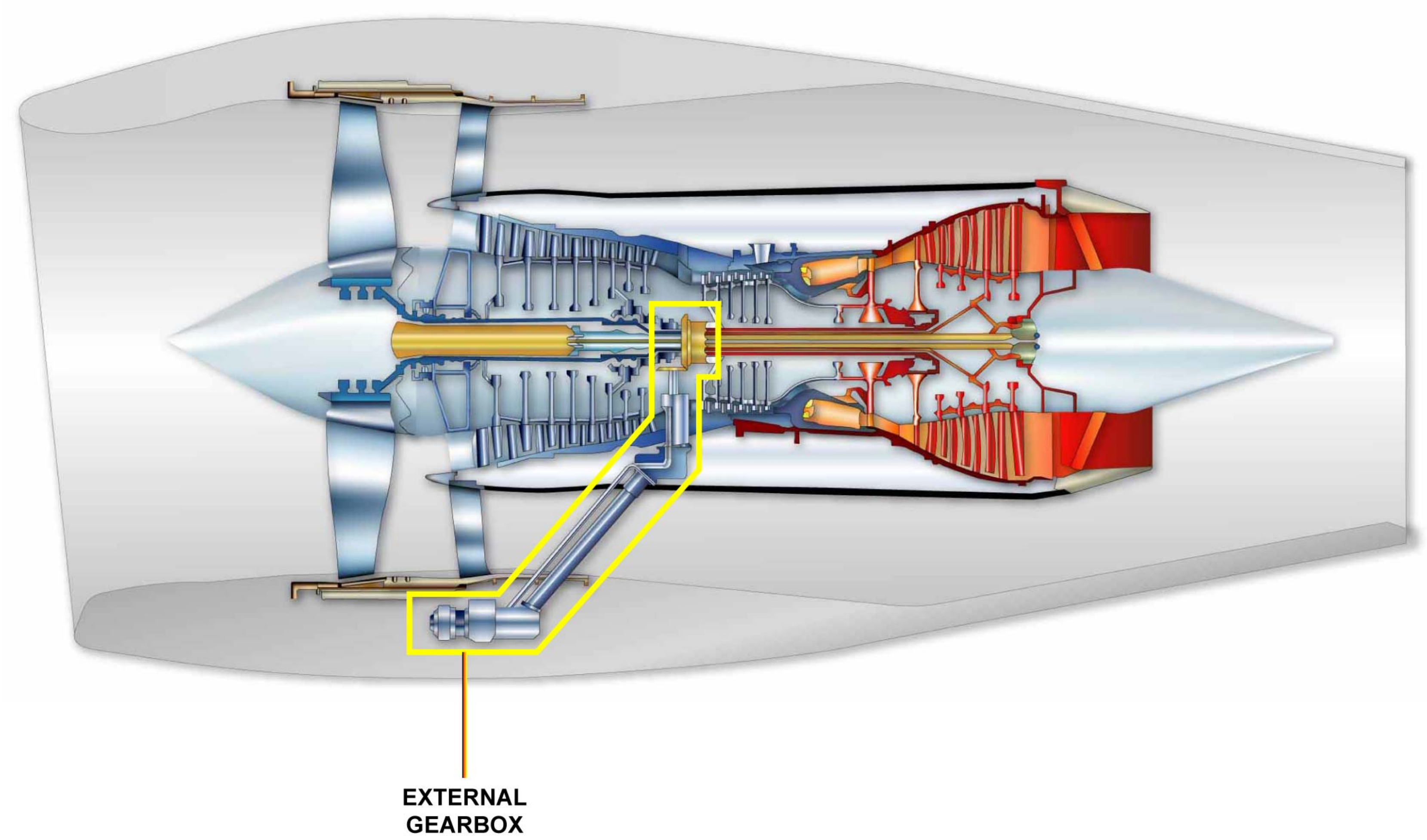
MODULAR ENGINE DESIGN - HP ROTOR

70 POWER PLANT RR TRENT 700 PRESENTATION (1)

MODULAR ENGINE DESIGN (continued)

ACCESSORY DRIVE

The external gearbox is attached to the bottom of the LP compressor case and is driven by the HP rotor through an internal gearbox. The fuel pump, oil pump assembly, hydraulic pumps, Integrated Drive Generator (IDG) and the Electronic Engine Controller (EEC) Dedicated Alternator are all attached to and driven by the external gearbox.
The starter is also attached to the external gearbox. During engine starting, the starter rotates the HP compressor through the external and internal gearboxes.

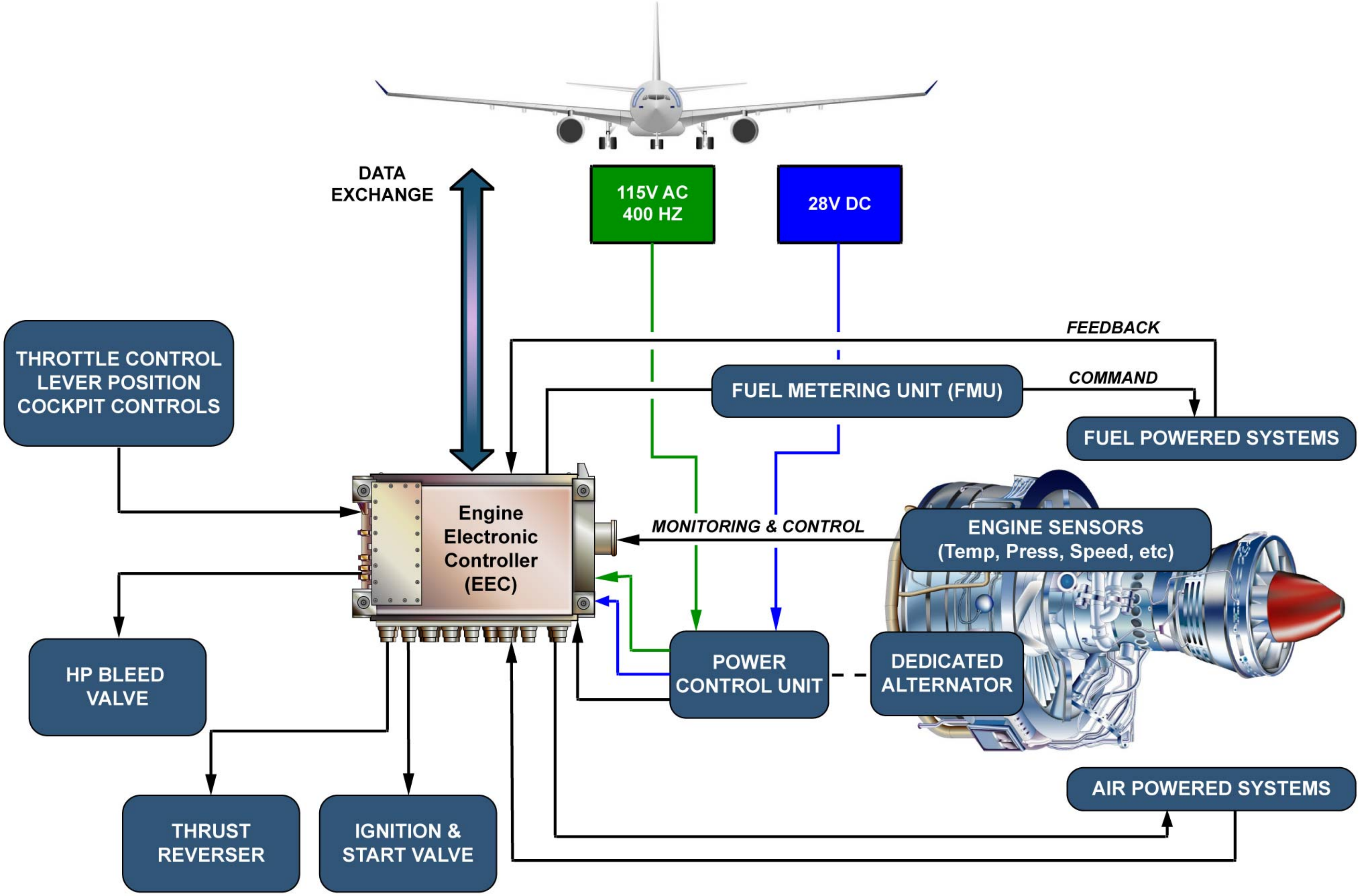


MODULAR ENGINE DESIGN - ACCESSORY DRIVE

70 POWER PLANT RR TRENT 700 PRESENTATION (1)

FADEC

In order to increase engine reliability and efficiency, the Full Authority Digital Engine Control (FADEC) gives full range of engine control to achieve steady state and transient engine performances when operated in combination with aircraft subsystems.
An EEC and a dual channel computer installed on the engine fan case on the left hand side, control each engine. The EEC controls the engine during start and all operations. The EEC manages engine thrust and protects against overspeed and overtemperature by controlling the engine sub-systems. The EEC also monitors all engine subsystems and sensors for failure. A The gearbox drives a dual-output EEC Dedicated alternator, which supplies power to the FADEC when the engine is running. The FADEC system has the dual channel EEC and the following peripherals:
- Fuel Metering Unit (FMU),
- EEC Dedicated Alternator,
- compressor control systems (Variable Stator Valve (VSV), IP / HP Bleed Valves),
- turbine Impingement Cooling system (TIC),
- start system (starter shutoff valve, ignition exciters),
- thrust Reverser system,
- engine sensors,
- electrical harnesses.

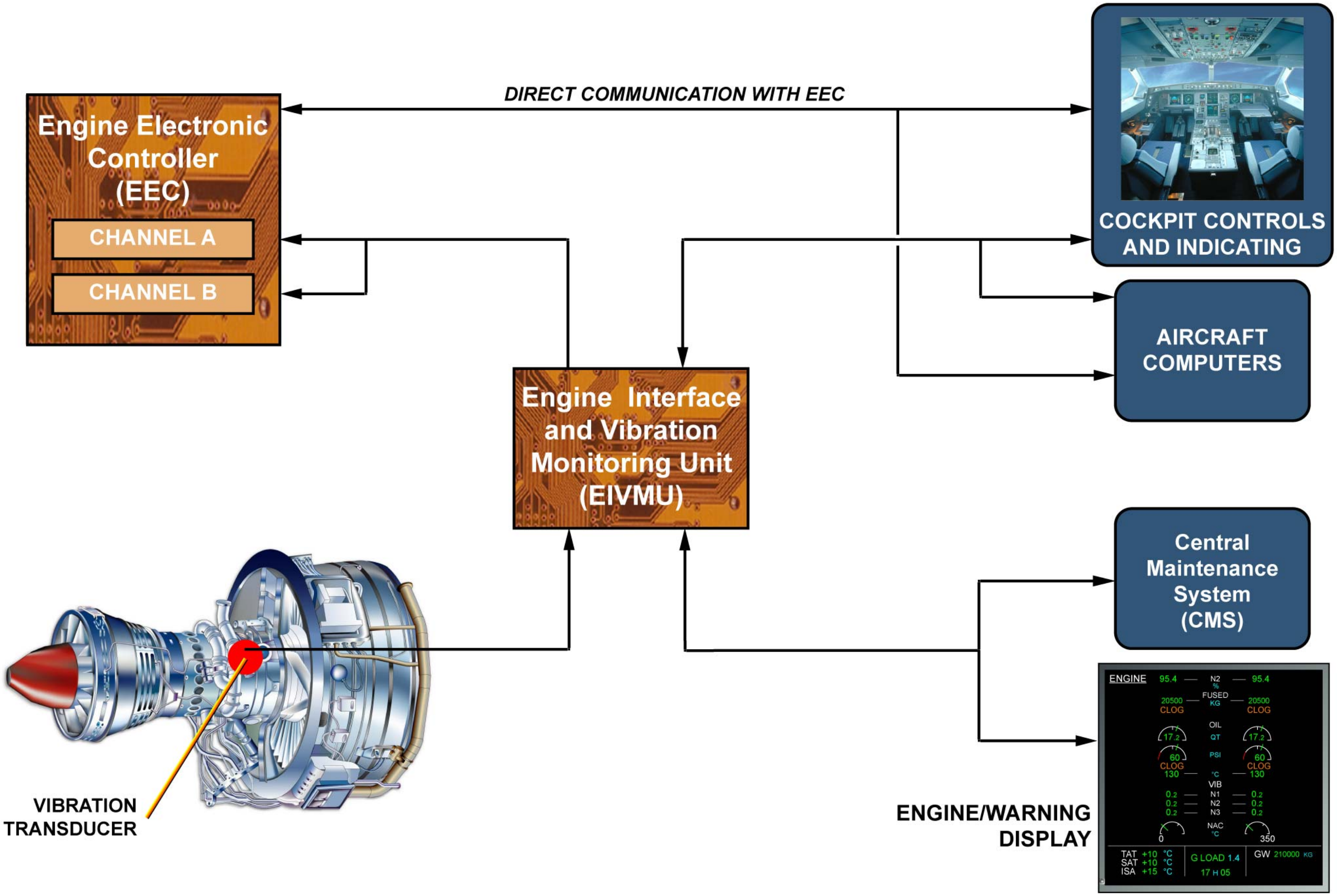

DATA EXCHANGE
115V AC 400 HZ
28V DC
FEEDBACK
COMMAND
THROTTLE CONTROL LEVER POSITION COCKPIT CONTROLS
FUEL METERING UNIT (FMU)
FUEL POWERED SYSTEMS
Engine Electronic Controller (EEC)
MONITORING & CONTROL
ENGINE SENSORS (Temp, Press, Speed, etc)
HP BLEED VALVE
POWER CONTROL UNIT
DEDICATED ALTERNATOR
AIR POWERED SYSTEMS
THRUST REVERSER
IGNITION & START VALVE

FADEC

70 POWER PLANT RR TRENT 700 PRESENTATION (1)

ENGINE INTERFACE AND VIBRATION MONITORING UNIT (EIVMU)

The EEC interfaces with various aircraft systems. Essential communication with the EEC (thrust lever position, air data, ECAM Primary indications, etc.) is direct to and from the applicable systems and controls. Non-essential communication (autothrust, Central Maintenance System (CMS), etc) is routed through the Engine Interface and Vibration Monitoring Unit (EIVMU) of each engine. The EIVMUs interface with various aircraft circuits and systems. The data is then transmitted in a single stream to each EEC channel.
Engine vibration monitoring is also accomplished by the EIVMU. Each EIVMU collects vibration data from the vibration sensor on the engine. The vibration information is displayed on the ECAM and is also available through the CMS for troubleshooting.



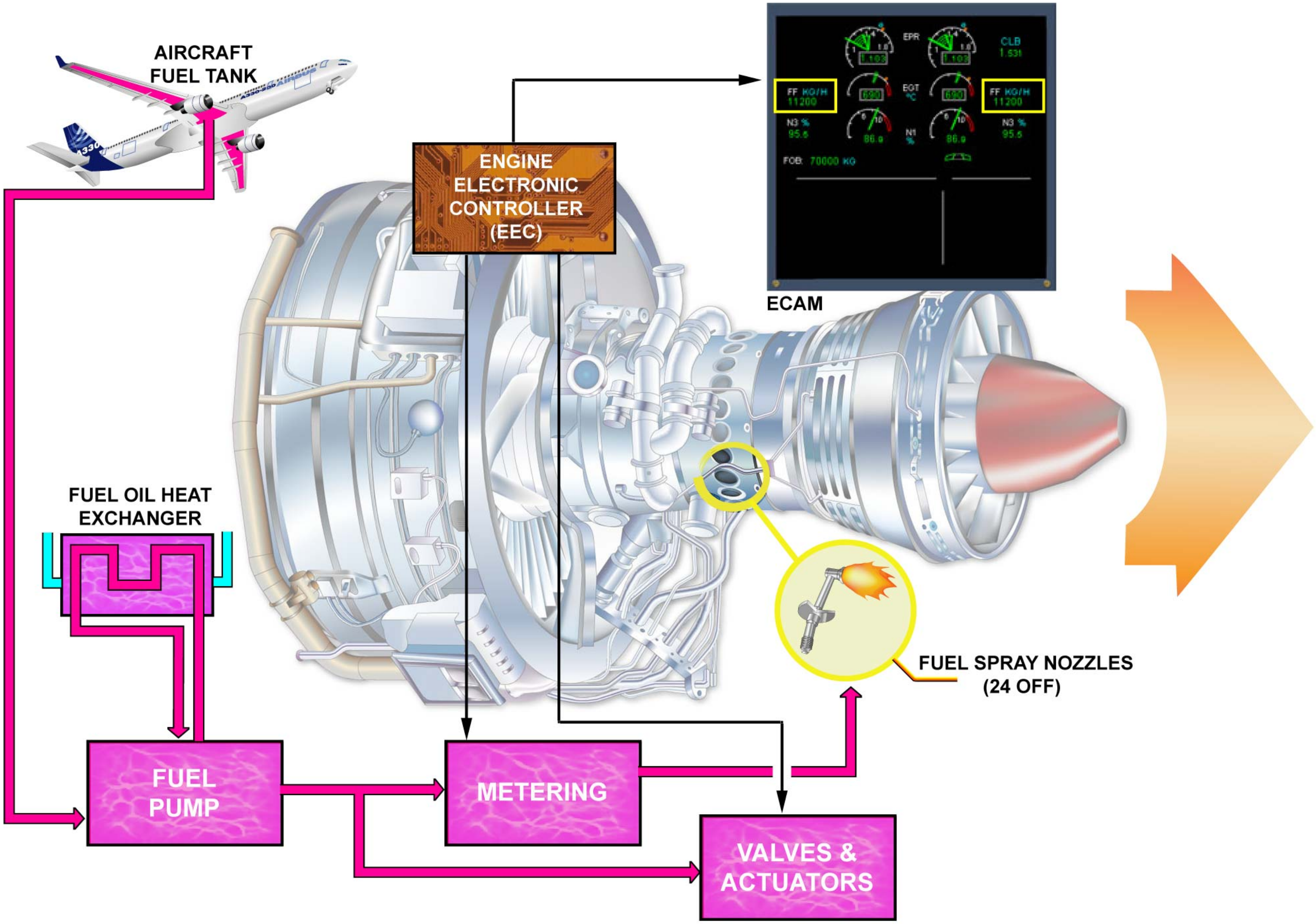
ENGINE INTERFACE AND VIBRATION MONITORING UNIT (EIVMU)

G6B08031 - G10T4T0 - FM70PB000000071

70 POWER PLANT RR TRENT 700 PRESENTATION (1)

ENGINE FUEL SYSTEM

The engine fuel system is designed to supply metered fuel to the combustion chamber according to the engine power demand. The fuel system is also used to cool the engine oil and supply servo pressure to operate valves and actuators.
The Engine Electronic Controller (EEC) controls the operation of the engine fuel system. The EEC also monitors the system for normal operation and ECAM fuel flow indication.



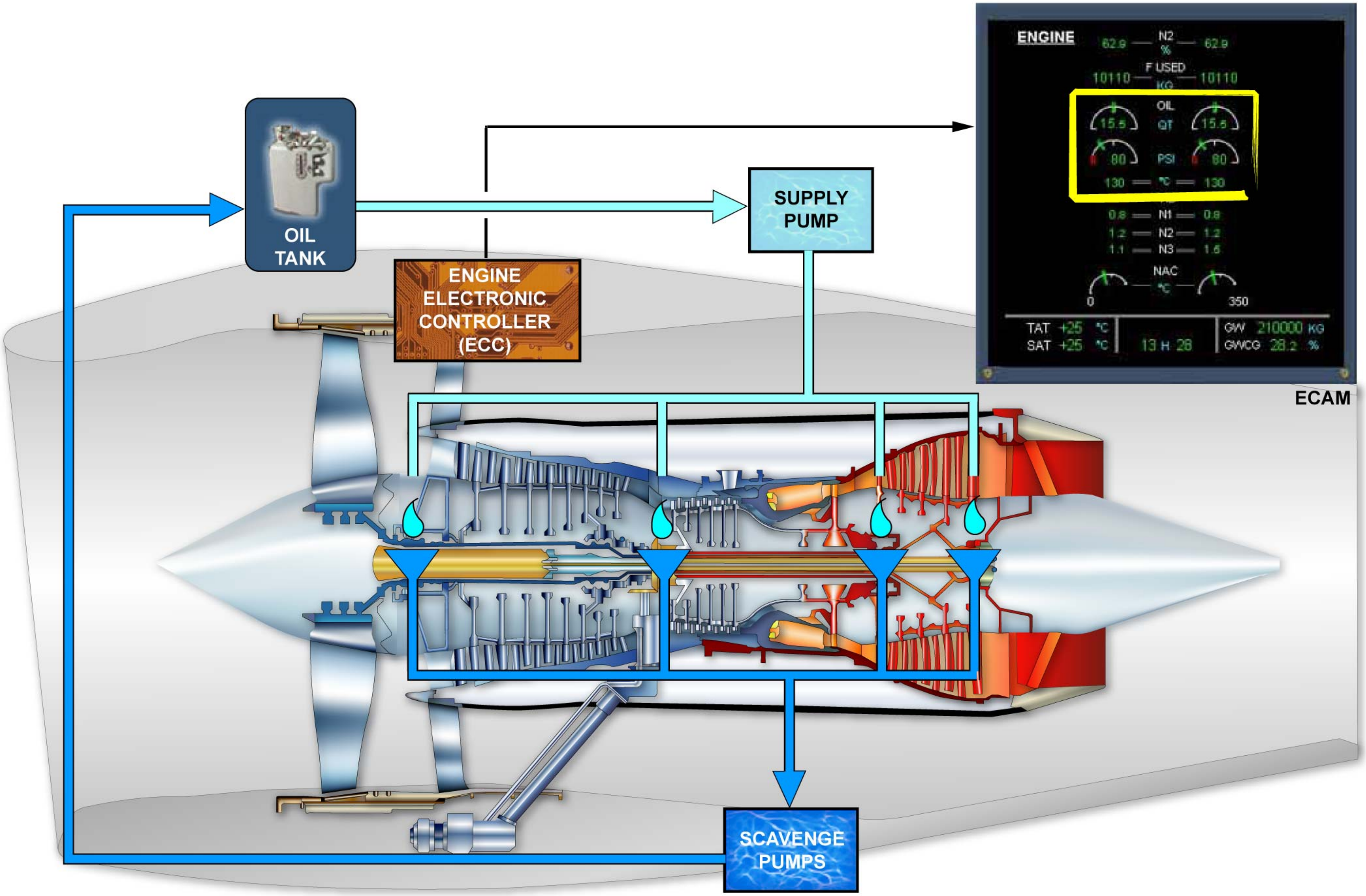
ENGINE FUEL SYSTEM

G6B08031 - G10T4T0 - FM70PB0000000071

70 POWER PLANT RR TRENT 700 PRESENTATION (1)

OIL SYSTEM

The primary function of the oil system is to supply sufficient oil at the correct temperature and pressure to the engine internal drives, gears and bearings for lubrication, to decrease temperature and keep wear to a minimum. The oil system is also designed to heat the fuel to prevent fuel icing.


OIL
TANK
ENGINE
ELECTRONIC
CONTROLLER
(ECC)
SUPPLY
PUMP
SCAVENGE
PUMPS
ENGINE
N2
%
62.9
62.9
F USED
KG
10110
10110
OIL
QT
15.5
15.5
PSI
80
80
°C
130
130
N1
0.8
0.8
N2
1.2
1.2
N3
1.1
1.6
NAC
°C
0
350
TAT +25 °C
SAT +25 °C
13 H 28
GW 210000 KG
GWCG 28.2 %
ECAM

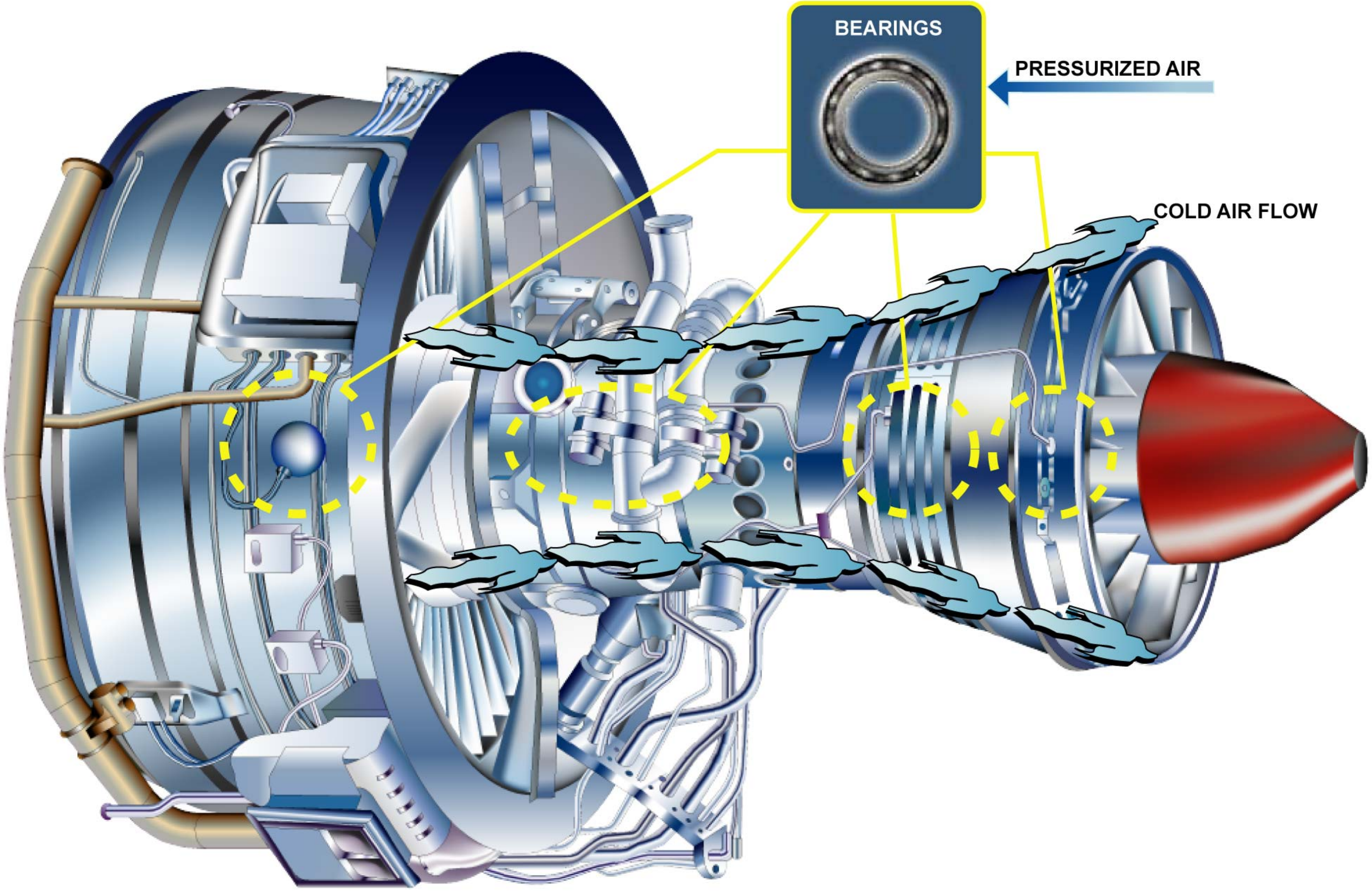
OIL SYSTEM

70 POWER PLANT RR TRENT 700 PRESENTATION (1)

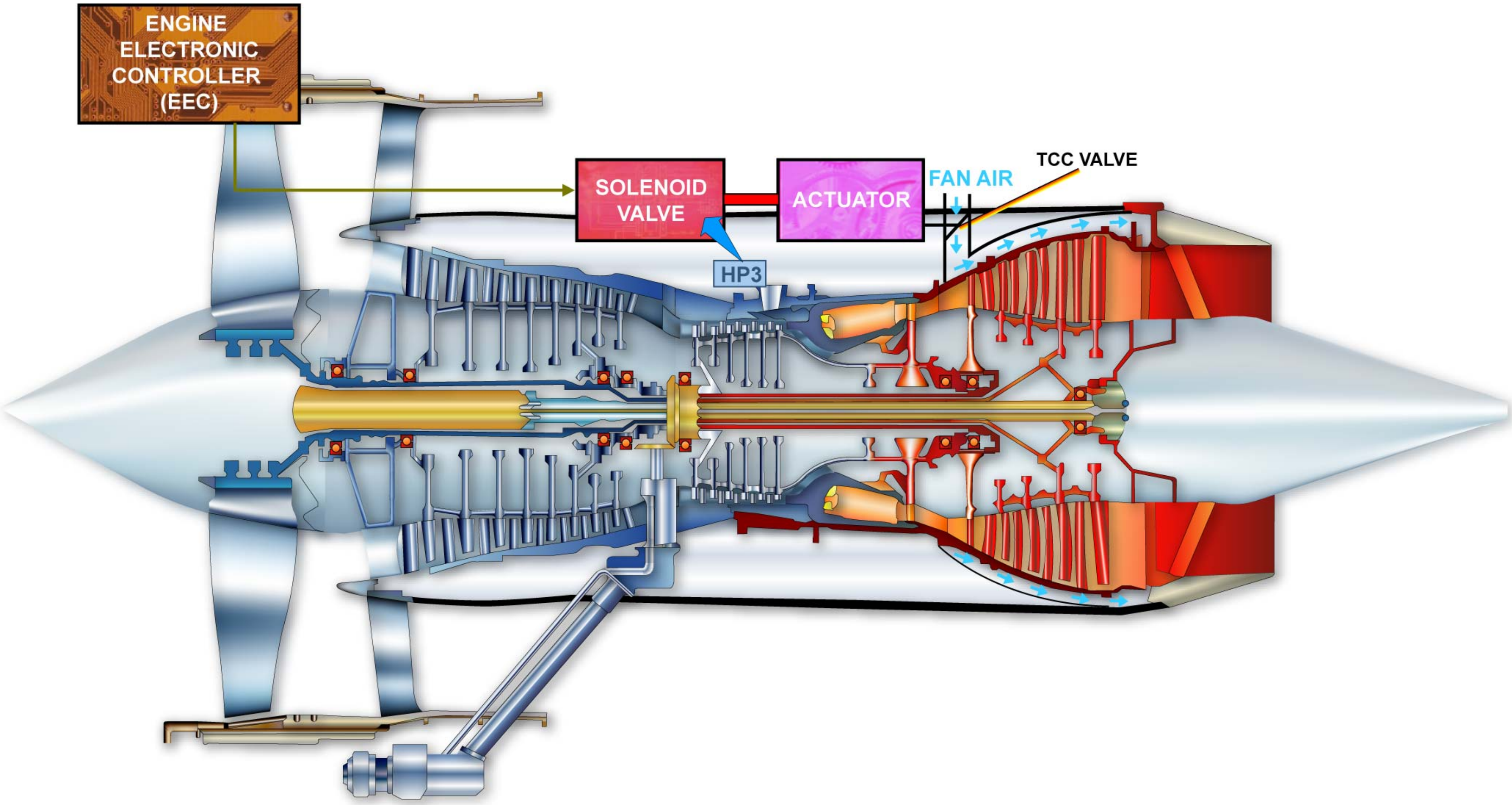
COOLING AND SEALING SYSTEM

The engine is externally cooled with fan air and internally cooled with air supplied from the engine compressors.
Pressurized air is also used to seal the engine bearing chambers to prevent oil leakage.
External cooling is done through the Turbine Case Cooling system (TCC) using air from the LP compressor (fan air). This system cools the IP and LP turbine cases and reduces the IP turbine blade tip clearance in order to improve the turbine efficiency.
The EEC electrically controls the TCC system via a solenoid valve. It is pneumatically operated using HP3 air by means of an actuator controlling the fan airflow delivered to the turbine cases.
The nacelle cooling is divided into three zones:
- zone 1, related to the fan case compartment, is cooled by external air,
- zone 2, related to the intermediate case compartment, is cooled by the fan air,
- zone 3, related to the core engine compartment, is cooled by the fan air.

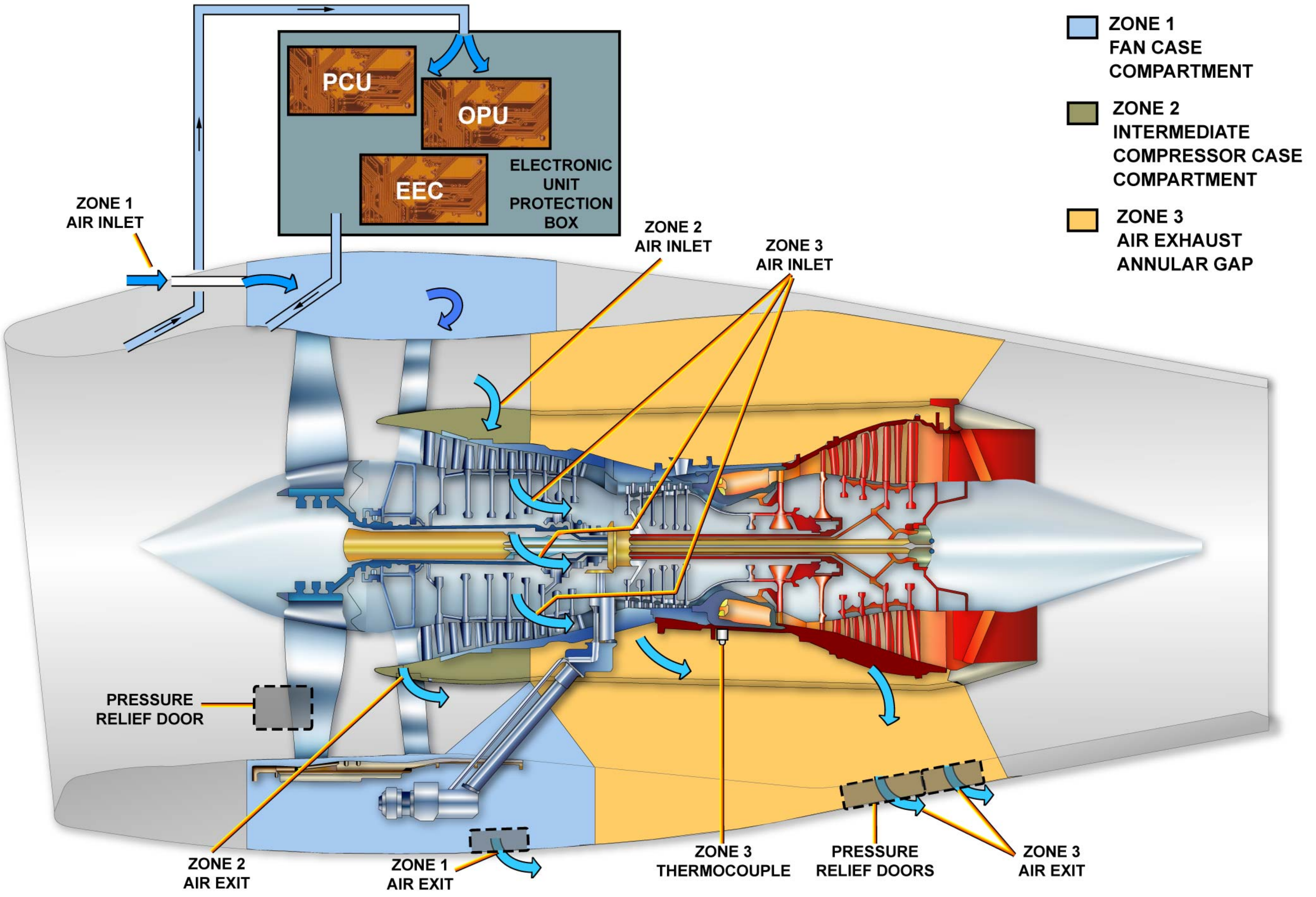
The Air from the fan inlet internally cools the electronic unit protection box, installed in zone 1 and containing the Engine Electronic Controller (EEC), the Overspeed Protection Unit (OPU) and the Power Control Unit (PCU).



COOLING AND SEALING SYSTEM



COOLING AND SEALING SYSTEM



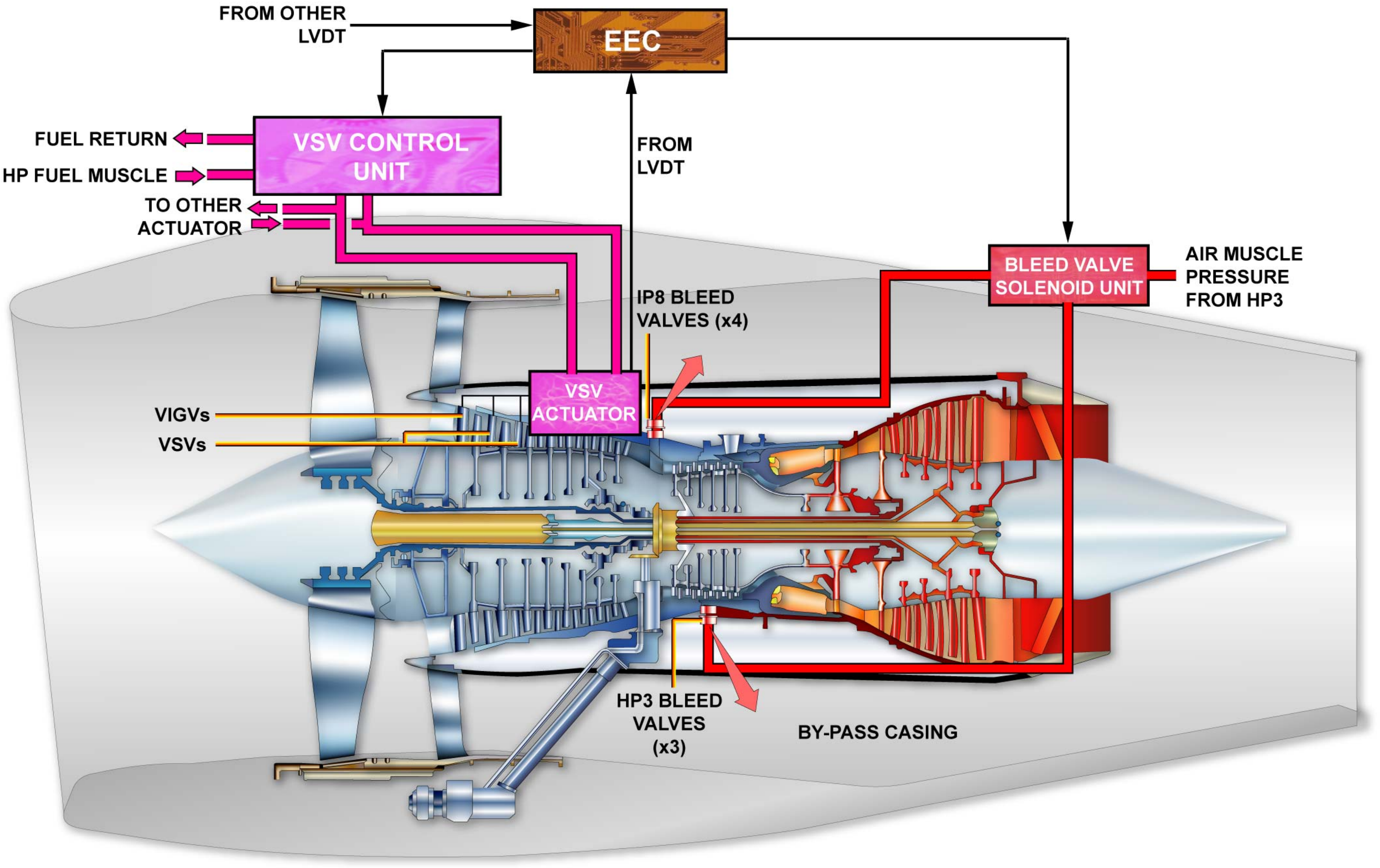
COOLING AND SEALING SYSTEM

G6B08031 - G10T4T0 - FM70PB000000071

70 POWER PLANT RR TRENT 700 PRESENTATION (1)

IP & HP BLEED VALVES

Seven bleed valves are installed around the IP and HP compressor. Four IP bleed valves are installed on and around the compressor intermediate case and aligned with stage 8 of the IP compressor. Three HP bleed valves are installed at the front of the combustion outer case and aligned with stage 3 of the HP compressor. Two HP bleed valves, HP3.3 and HP3.2, are installed at the top right and bottom right of the case. The third one, HP3.1, is installed at the bottom left of the case.
These valves are operated by servo (muscle) air pressure from the HP compressor third stage (HP3). The servo pressure to operate each bleed valve is controlled through the bleed valve solenoid unit based upon signals from the EEC.



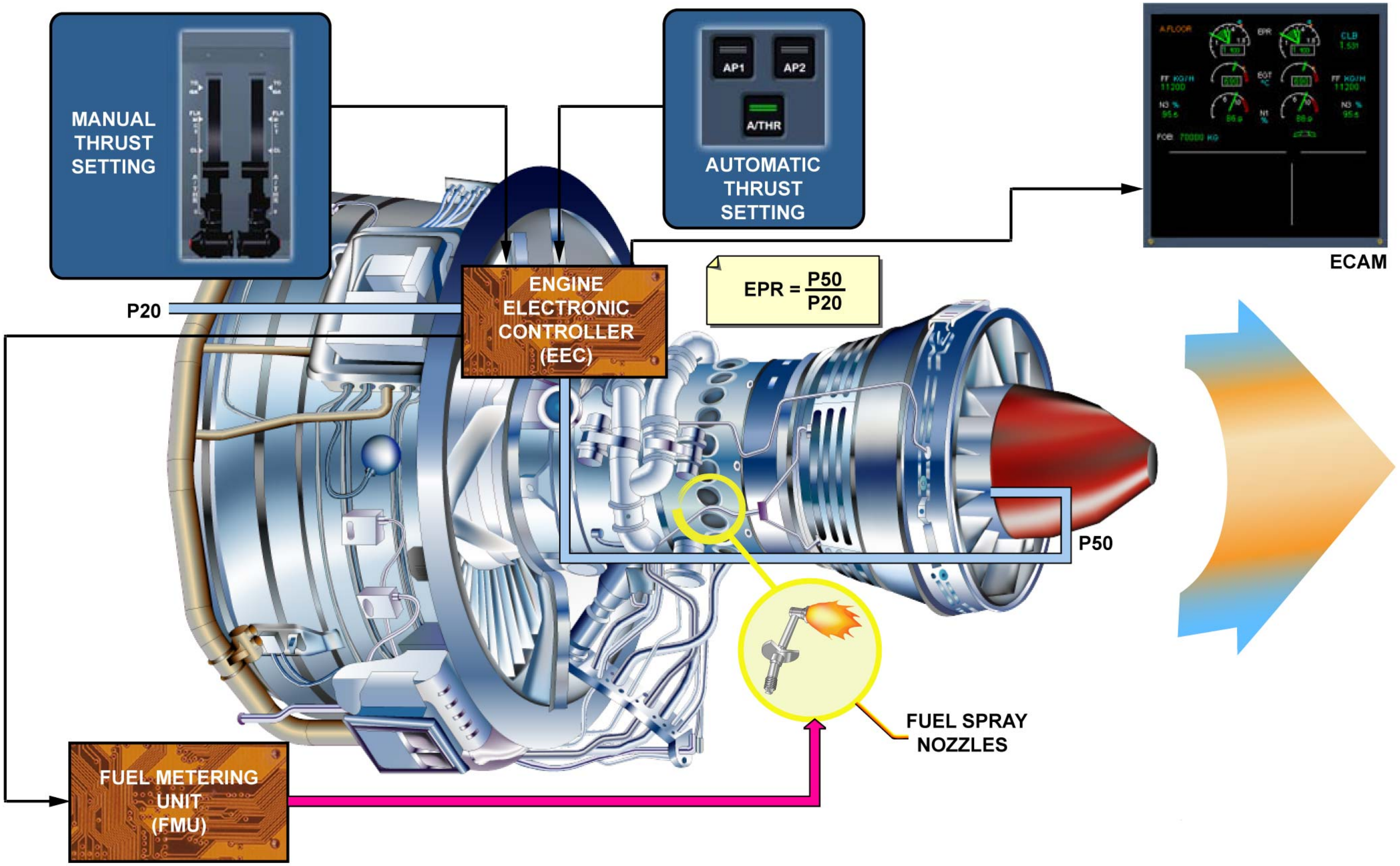
IP & HP BLEED VALVES

70 POWER PLANT RR TRENT 700 PRESENTATION (1)

THRUST CONTROL SYSTEM

The Engine Electronic Controller (EEC) controls the engine thrust. The engine thrust can be set:
- Manually by the throttle control lever or,
- Automatically by the Auto Flight System (AFS).

The main thrust control parameter is the Engine Pressure Ratio (EPR).
The EPR is replaced by N1 (LP rotor) in reverse thrust or in backup mode.
The EEC calculates the EPR as a function of the total pressure at the engine inlet P20 and the total pressure at the core engine outlet P50. It is expressed as a ratio: EPR = P50/P20.

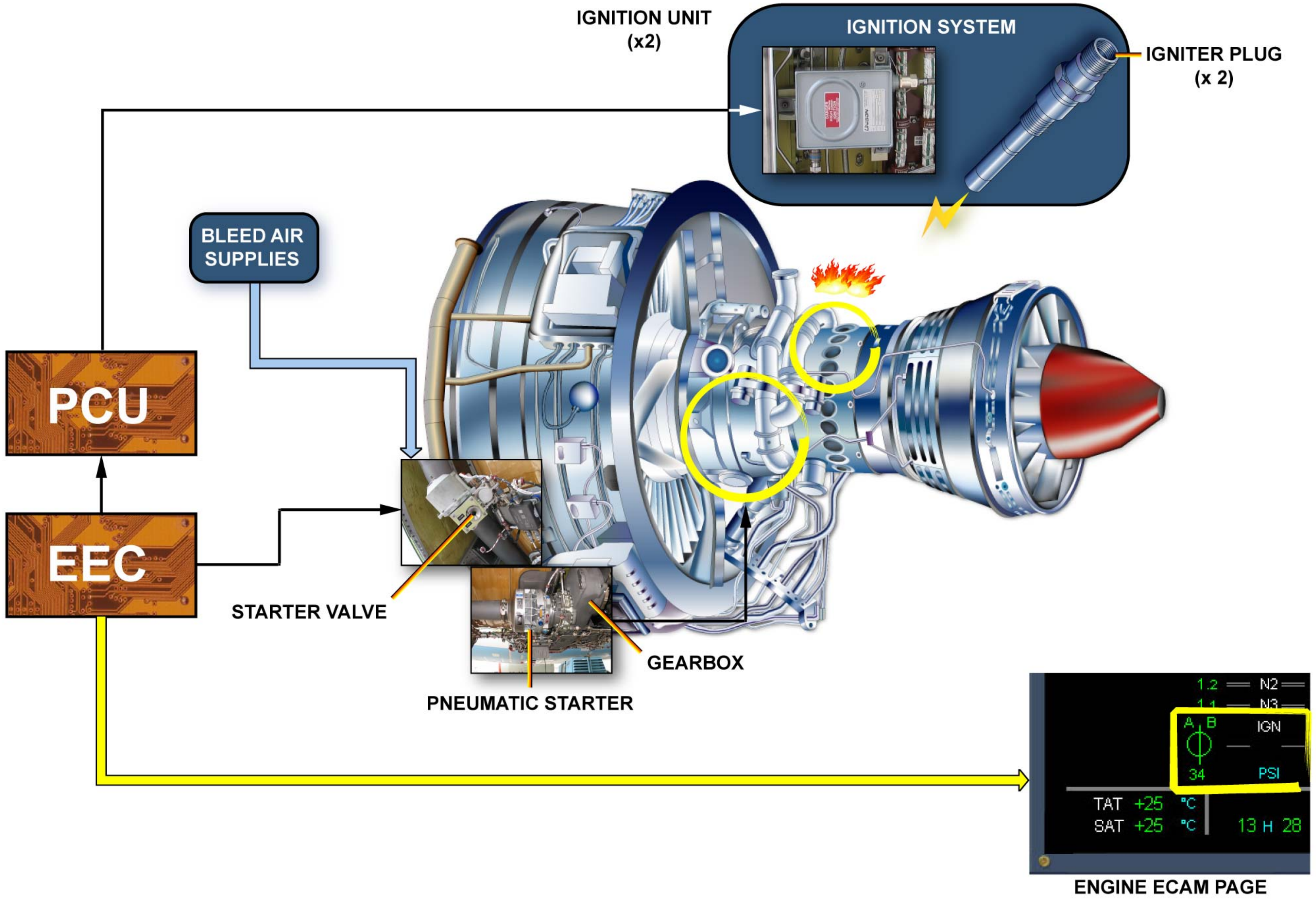


THRUST CONTROL SYSTEM

70 POWER PLANT RR TRENT 700 PRESENTATION (1)

IGNITION AND STARTING SYSTEM

The Engine Electronic Controller (EEC) selects engine starting, motoring and ignition sequences according to digital command inputs from the Engine Interface and Vibration Monitoring Unit (EIVMU). To achieve these functions, the following sub-systems are combined:
- starting,
- fuel,
- ignition.



IGNITION AND STARTING SYSTEM

70 POWER PLANT RR TRENT 700 PRESENTATION (1)

THRUST REVERSER SYSTEM

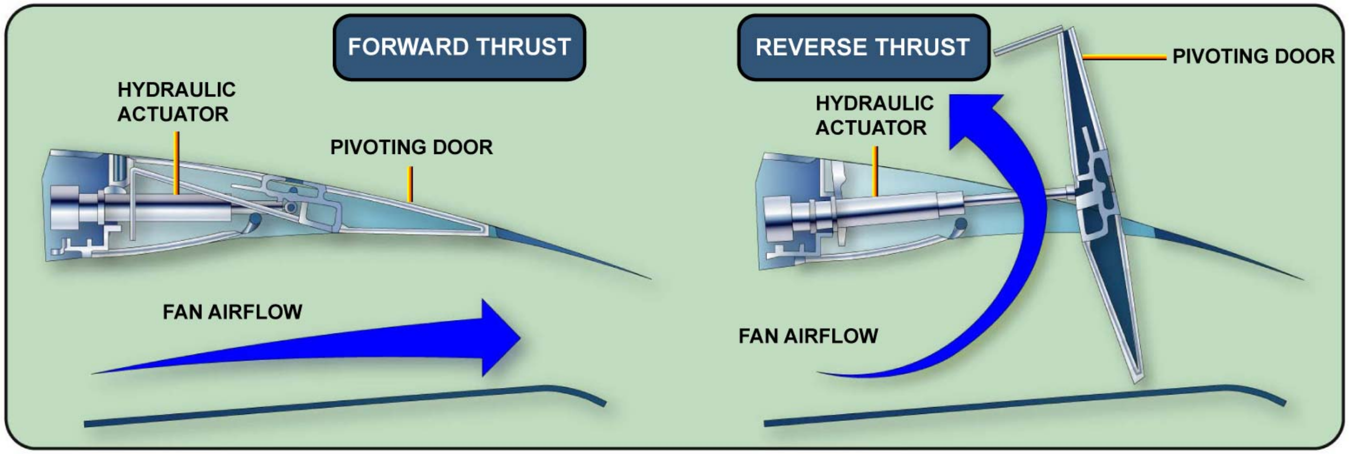
When reverse thrust is selected, 4 pivoting doors open to direct engine thrust. Each half of the thrust reverser includes two pivoting doors. Individual actuators operate these doors. Once the tertiary locks are released, the actuators extend and open the pivoting doors. Reverse thrust is only available on the ground.

The EEC controls the Reverse thrust . The flight crew manually selects the Thrust Reverse by lifting the thrust reverse levers on the throttle control levers. The reversers are deployed using hydraulic pressure. The reverse thrust command is sent to the EEC, the EIVMU and the Flight Control Primary Computers (FCPCs). The EEC operates the thrust reverser isolation valve to supply hydraulic pressure to the system. The EIVMU verifies "aircraft-on-ground" and "thrust reverse selected" and enables the EEC to operate the directional valve. The directional valve directs pressure to unlock the primary locks and extends the actuators to deploy each pivoting door.

An additional layer of protection against inadvertent deployment is the tertiary locking system. Each pivoting door is locked in the stow position by a mechanical lock. The FCPC controls these locks.

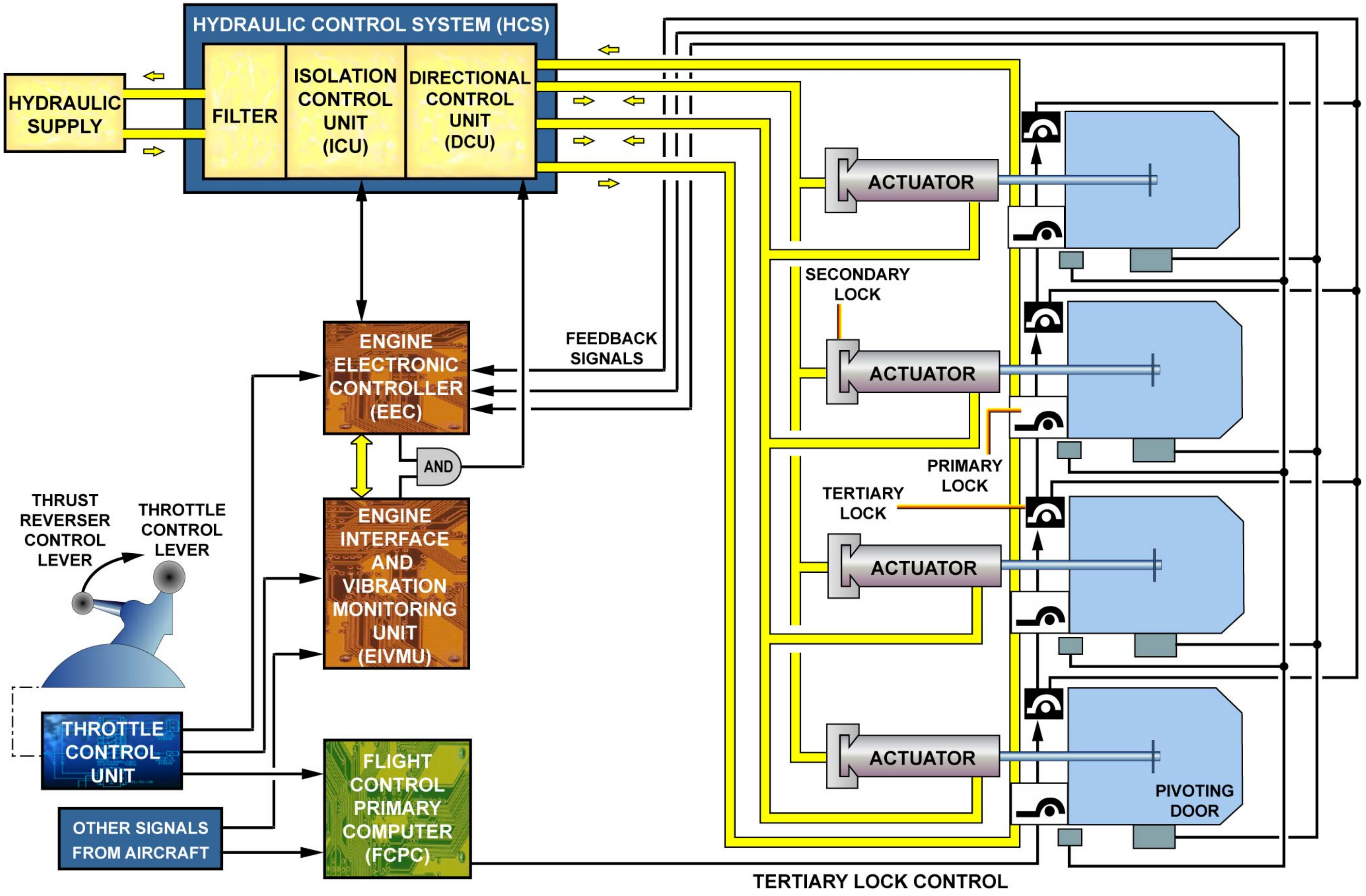
THRUST REVERSERS STOWED

THRUST REVERSERS DEPLOYED



THRUST REVERSER SYSTEM

G6B08031 - G10T4T0 - FM70PB000000071



THRUST REVERSER SYSTEM

G6B08031 - G10T4T0 - FM70PB000000071

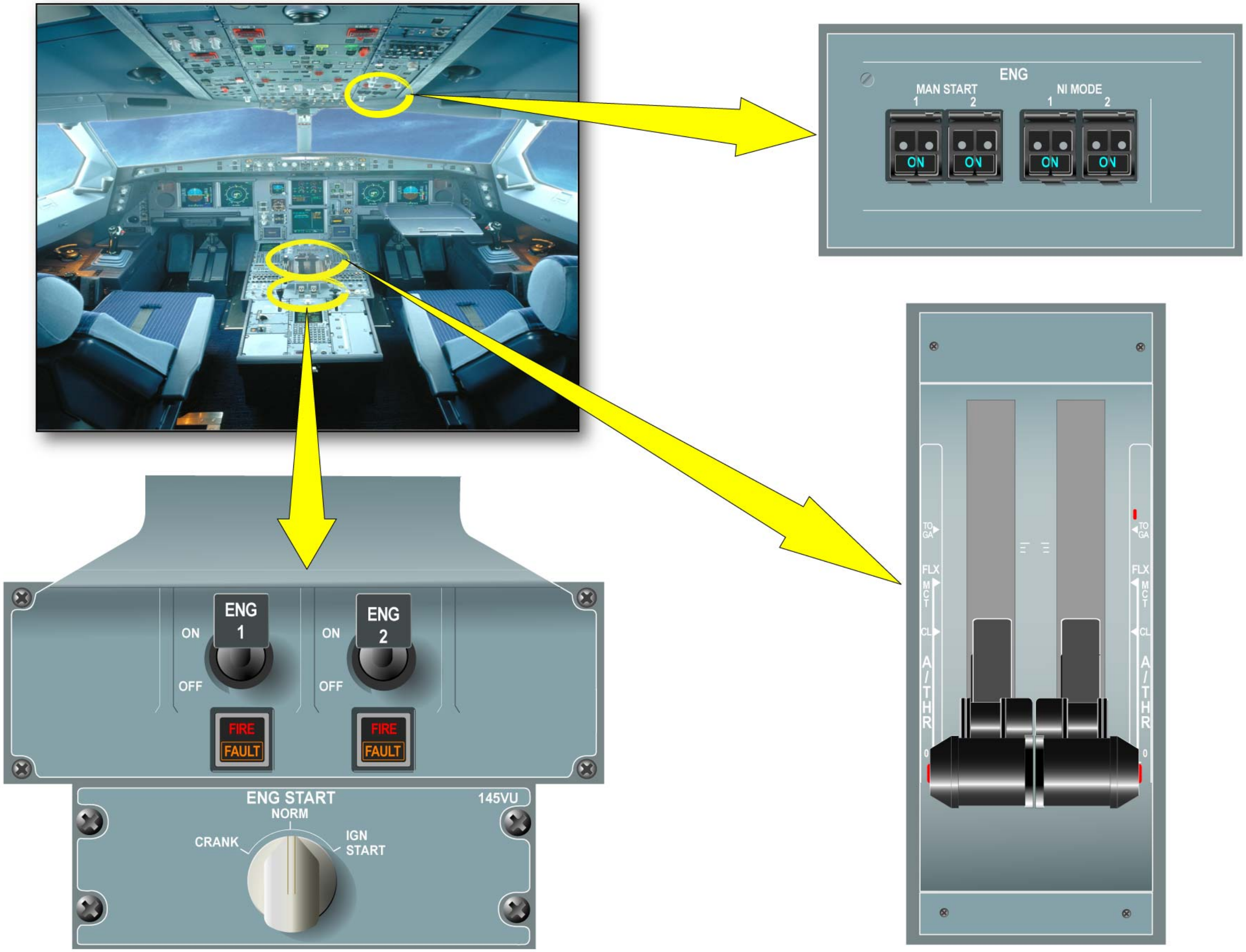
This Page Intentionally Left Blank

70 POWER PLANT RR TRENT 700 PRESENTATION (1)

CONTROL AND INDICATING

CONTROL PANELS

The engines are controlled by throttle control levers, which are installed on the center pedestal. They can only be moved manually. To select reverse thrust operation, each throttle control lever includes a reverse thrust control lever. This lever is also used to increase engine power in reverse.
Autothrust mode is the most efficient mode of operation in flight. When active, the autothrust can be disconnected using the two instinctive disconnect pushbuttons. These 2 red buttons are installed on the outside of each throttle control lever. This allows the engines to be controlled in manual thrust mode.
The controls for engine starting and shut down are installed on the center pedestal just behind the throttle control levers. The engine MAN START switches are installed on the overhead panel. These switches are used to initiate an engine manual start procedure. They are also used to initiate an engine dry or wet motoring procedure. The N1 mode switches are used to switch the primary engine control parameter to N1 if the normal EPR control fails.



CONTROL AND INDICATING - CONTROL PANELS

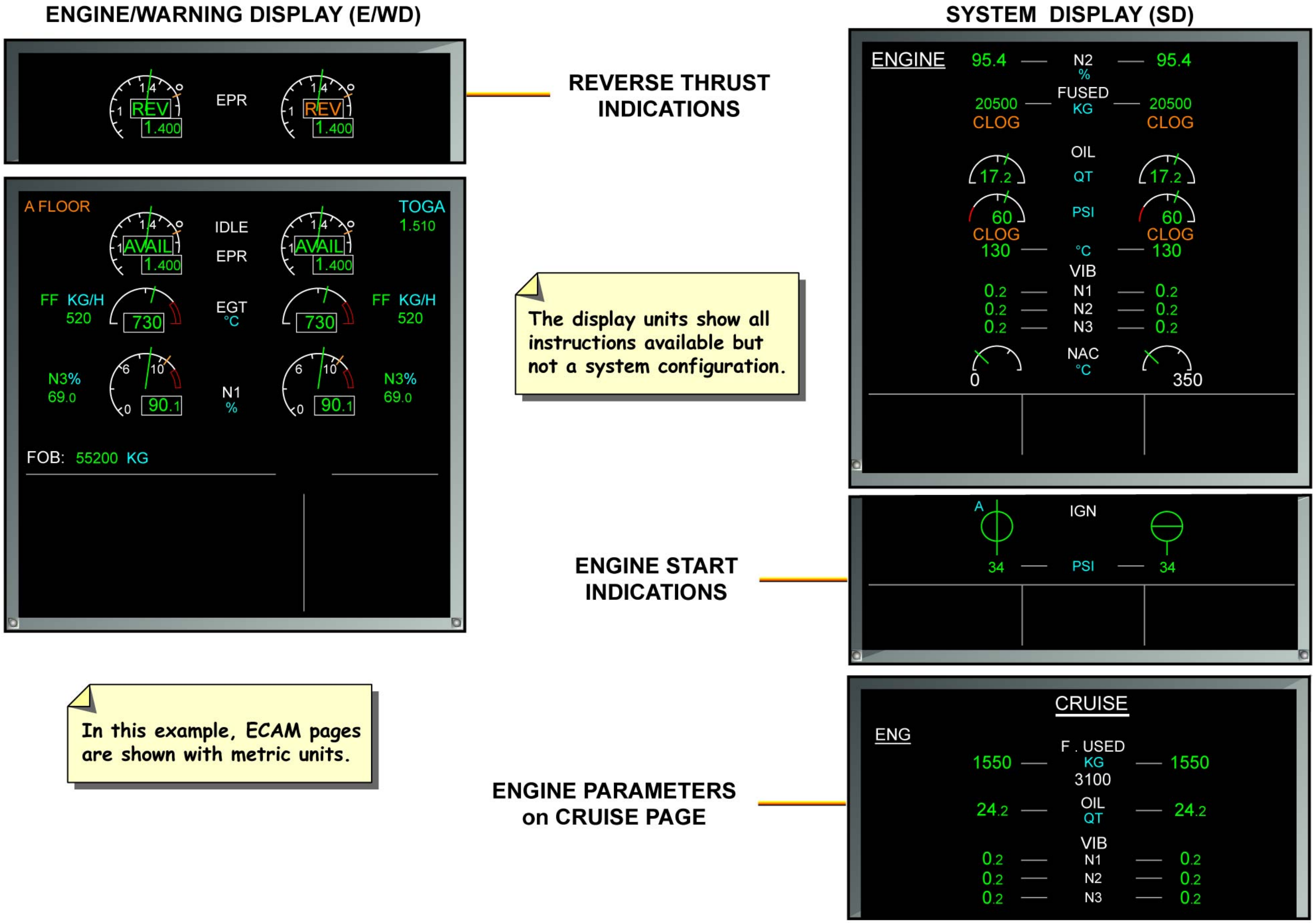
G6B08031 - G10T4T0 - FM70PB000000071

70 POWER PLANT RR TRENT 700 PRESENTATION (1)

CONTROL AND INDICATING (continued)

ECAM ENGINE INDICATIONS

The engine primary parameters are permanently displayed on the upper ECAM Engine/Warning Display. The engine secondary parameters are shown on the lower ECAM ENGINE page when it is selected or displayed automatically during an engine start or a fault. Bleed pressure, Starter valve position and ignition are displayed during engine start only. Some engine parameters are permanently displayed on the CRUISE page in flight.



CONTROL AND INDICATING - ECAM ENGINE INDICATIONS

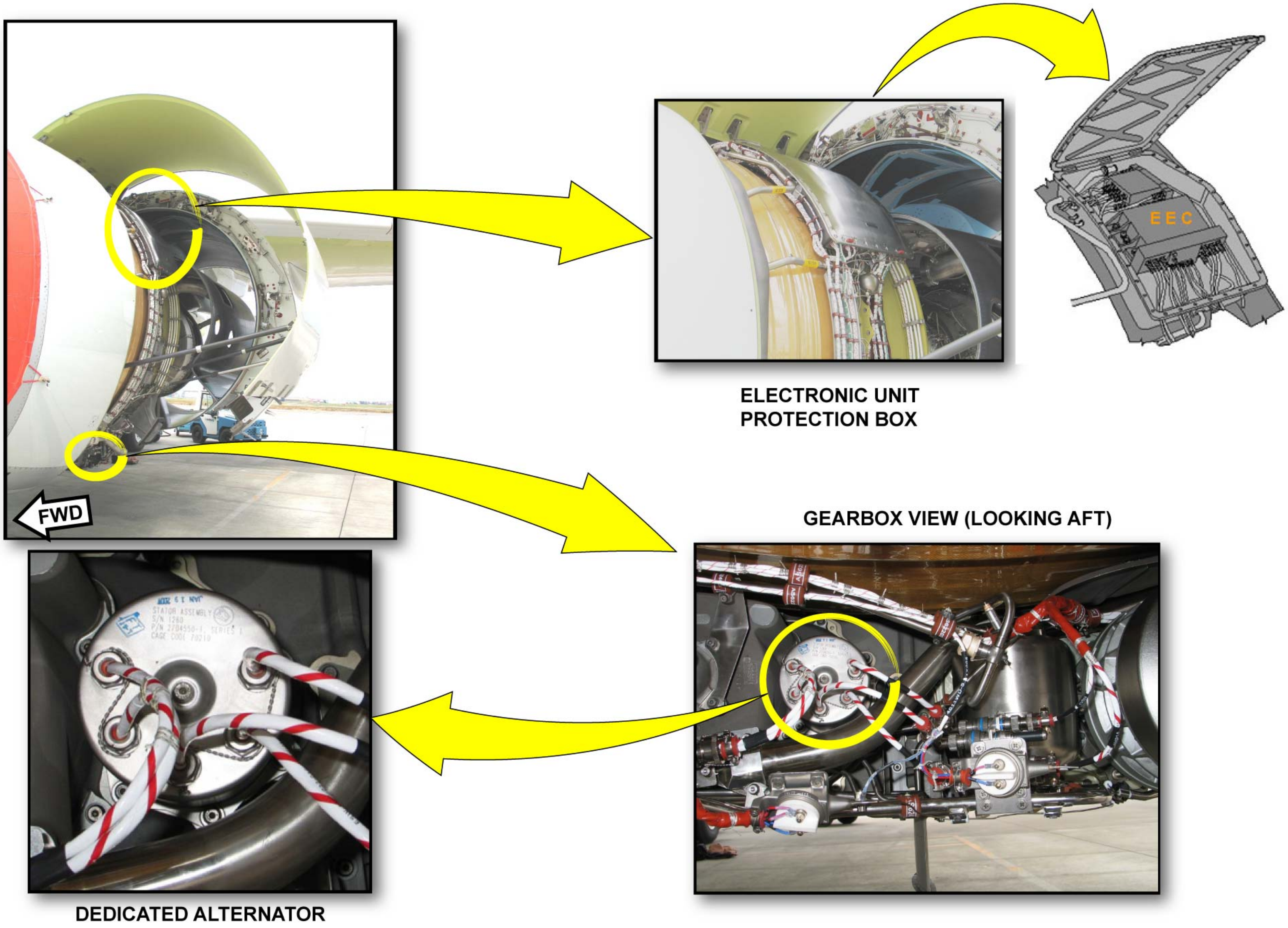
G6B08031 - G10T4T0 - FM70PB000000071

70 POWER PLANT RR TRENT 700 PRESENTATION (1)

COMPONENT LOCATION

FADEC

The EEC is installed on the fan case, on the left hand side. The EEC dedicated alternator is installed in the front face of the external gearbox.



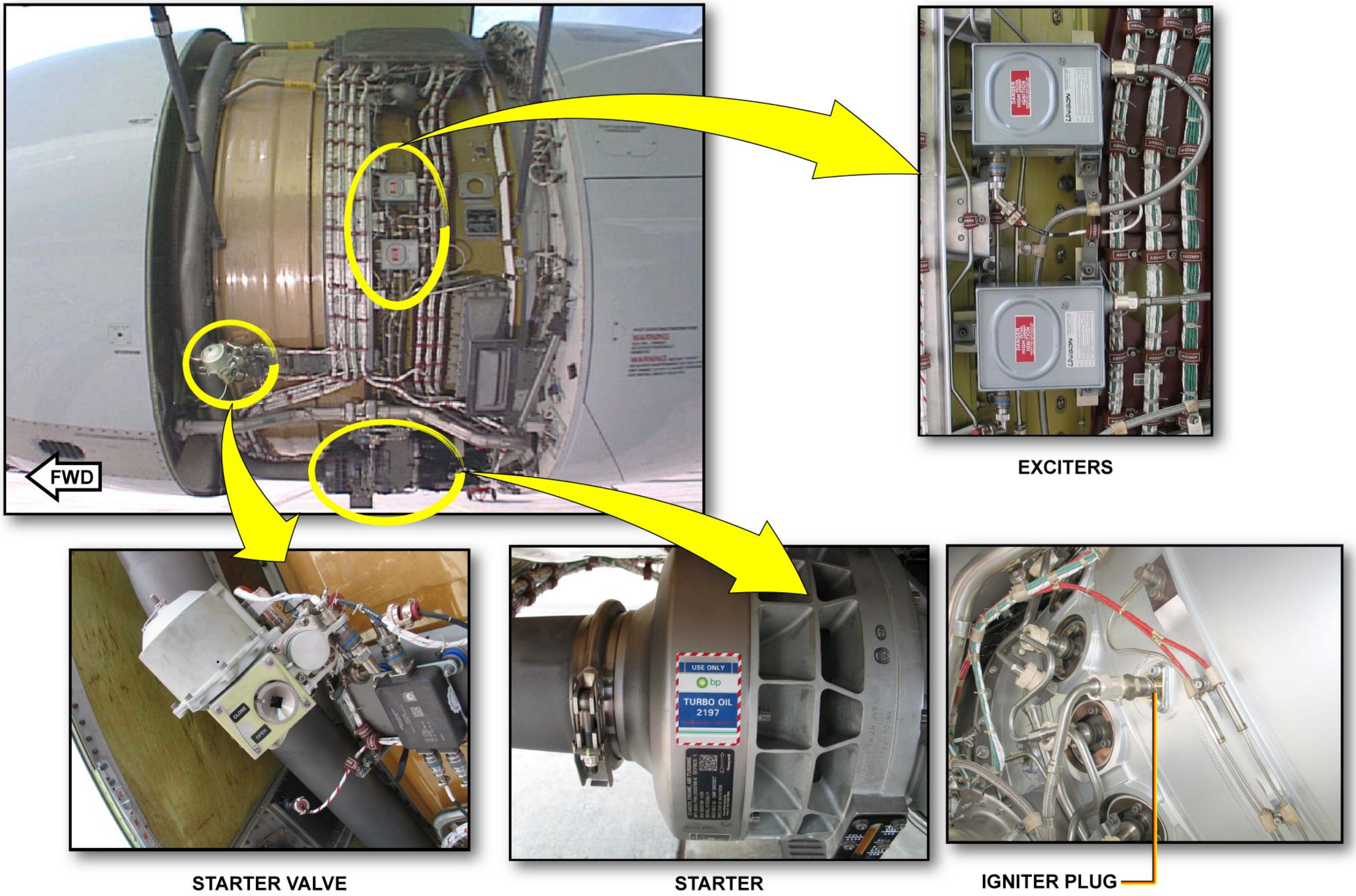
COMPONENT LOCATION - FADEC

70 POWER PLANT RR TRENT 700 PRESENTATION (1)

COMPONENT LOCATION (continued)

STARTING

Two ignition exciter units are installed on the fan case, on the left hand side. The starter air valve is found on the fan case, on the left hand side. The starter is attached to the front face of the external gearbox and also on the left hand side.



COMPONENT LOCATION - STARTING

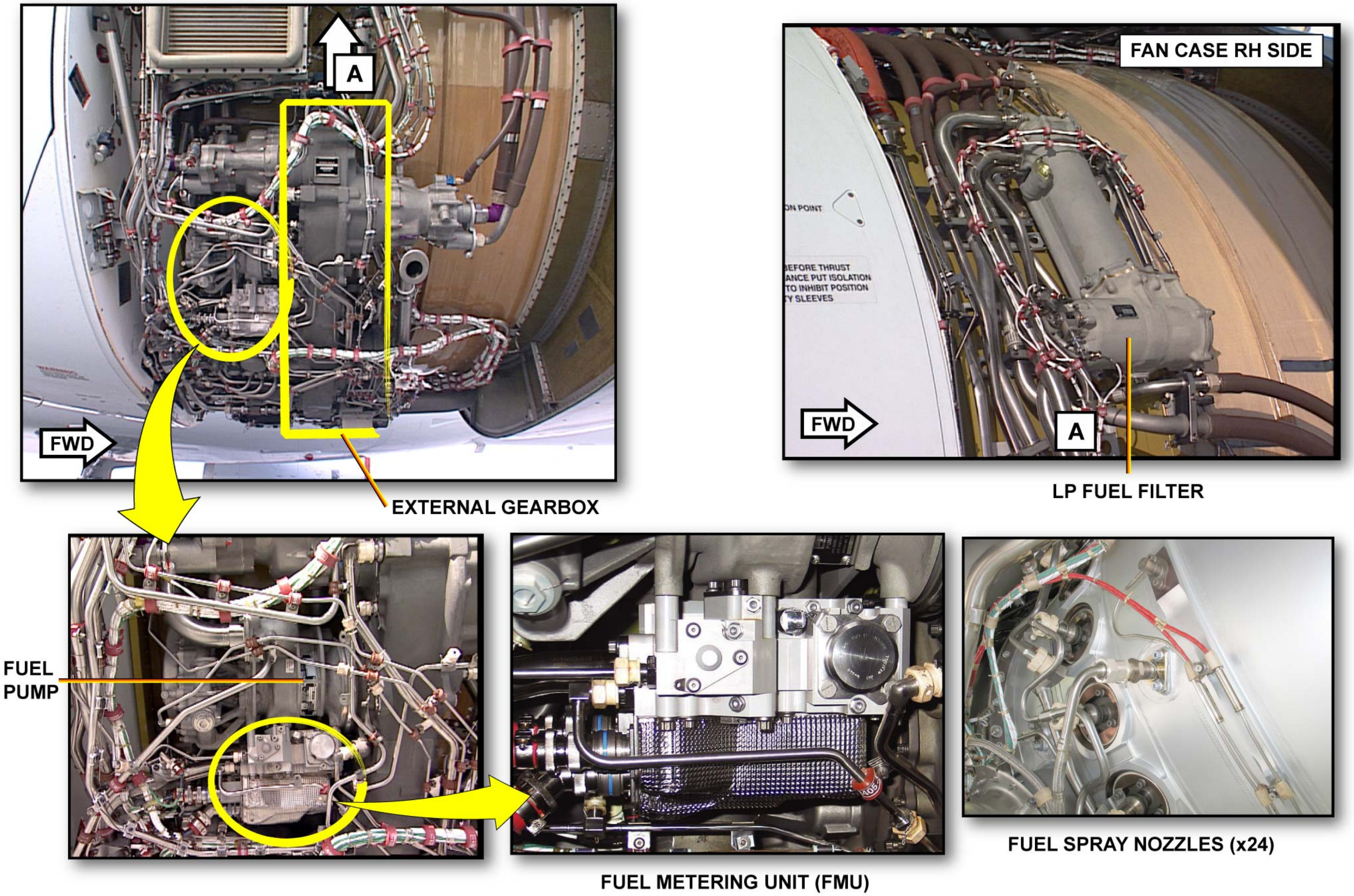
G6B08031 - G10T4T0 - FM70PB000000071

70 POWER PLANT RR TRENT 700 PRESENTATION (1)

COMPONENT LOCATION (continued)

FUEL

The main components of the fuel system are installed on the RH side of the engine. The fuel pump is attached to the aft face of the external gearbox on the lower right hand side of the engine. The Fuel Metering Unit (FMU) is attached to the bottom of the fuel pump. The EEC controls the FMU and supplies fuel to nozzles and engine sub-systems. The LP fuel filter is installed on the fuel/oil heat exchanger set up on the right hand side of the fan case.



COMPONENT LOCATION - FUEL

G6B08031 - G10T4T0 - FM70PB000000071

70 POWER PLANT RR TRENT 700 PRESENTATION (1)

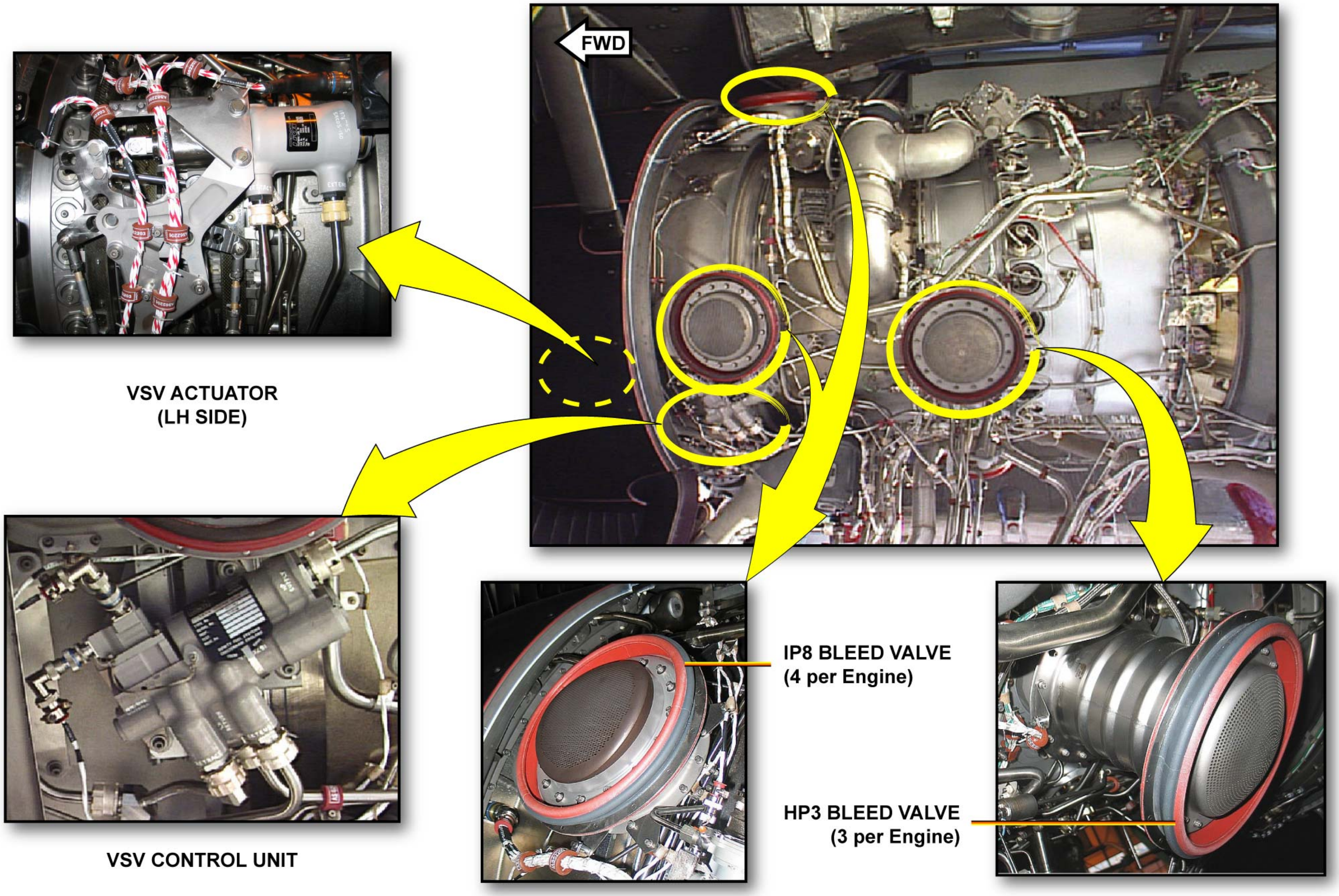
COMPONENT LOCATION (continued)

AIR

The main functions of the engine air systems are compressor control, and turbine clearance control. The EEC controls both systems.
The VSV system and the IP/HP Compressor Bleed Valves are the primary compressor control systems. These systems let the engine operate efficiently during starting, acceleration and deceleration:
- 2 fuel-powered actuators operate the VSV system installed on either side of the compressor case which move the variable inlet guide vanes and the first 2 rows of the intermediate pressure compressor stator vanes.
- the solenoids control and operate with high air pressure the IP and HP Bleed valves . There are four IP8 (intermediate compressor stage 8) and three HP3 (high pressure compressor stage 3) bleed valves found on the engine.

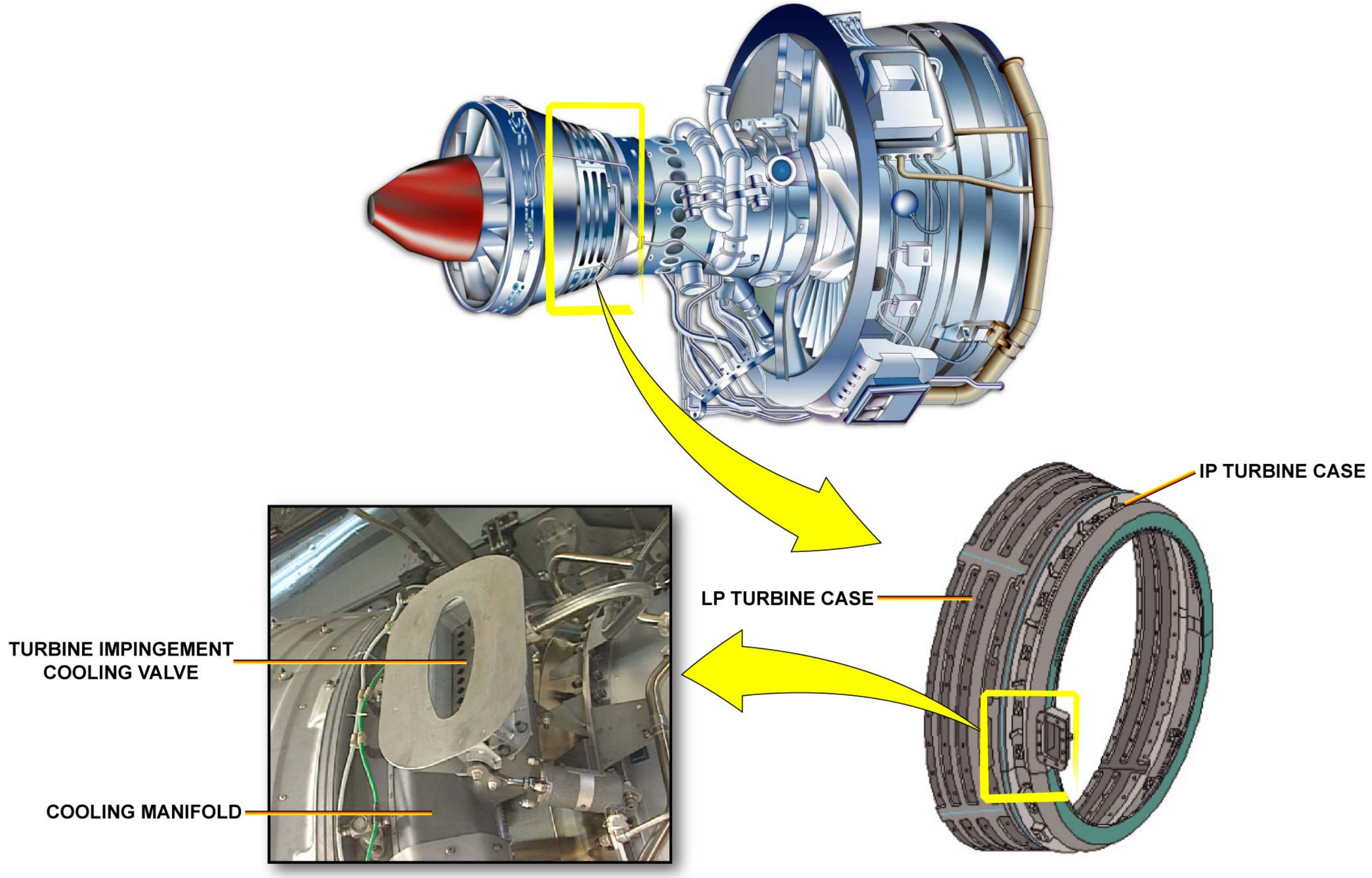
The Turbine Impingement Cooling (TIC) system increases engine efficiency by controlling turbine blade tip clearances. The TIC valve is operated by high-pressure air and controls the supply of fan air to the IP and LP turbine case manifolds to keep the case temperatures within limits and to control the IP turbine blade tip clearances.

G6B08031 - G10T4T0 - FM70PB0000071



COMPONENT LOCATION - AIR

G6B08031 - G10T4T0 - FM70PB000000071



COMPONENT LOCATION - AIR

G6B08031 - G10T4T0 - FM70PB000000071

This Page Intentionally Left Blank

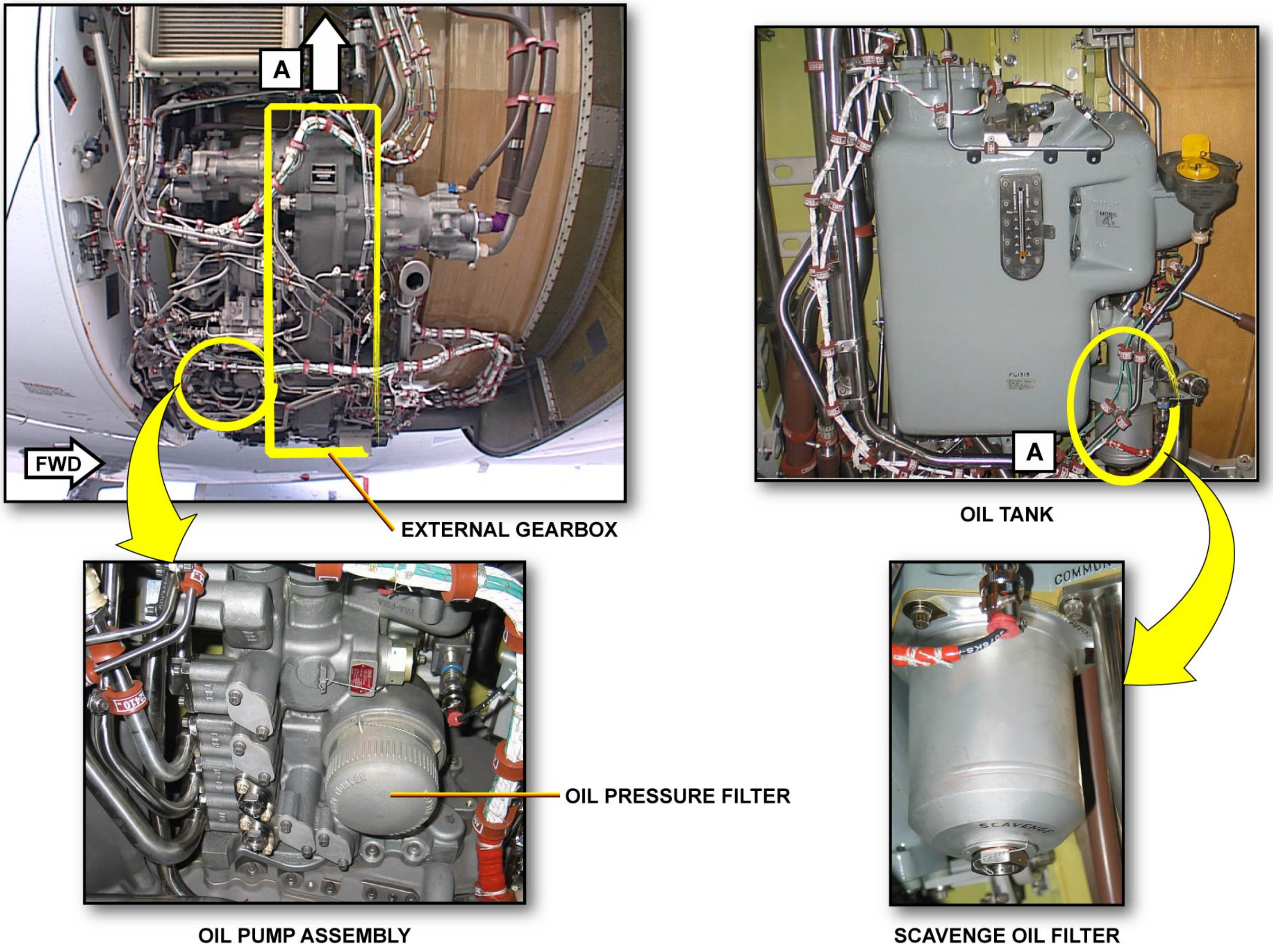
70 POWER PLANT RR TRENT 700 PRESENTATION (1)

COMPONENT LOCATION (continued)

OIL

The oil tank and scavenge filter are installed on the right fan case. The pressure filter is included in the oil pump assembly, which is installed on the aft face of the external gearbox at the 6 o'clock position.

G6B08031 - G10T4T0 - FM70PB000000071



COMPONENT LOCATION - OIL

G6B08031 - G10T4T0 - FM70PB000000071

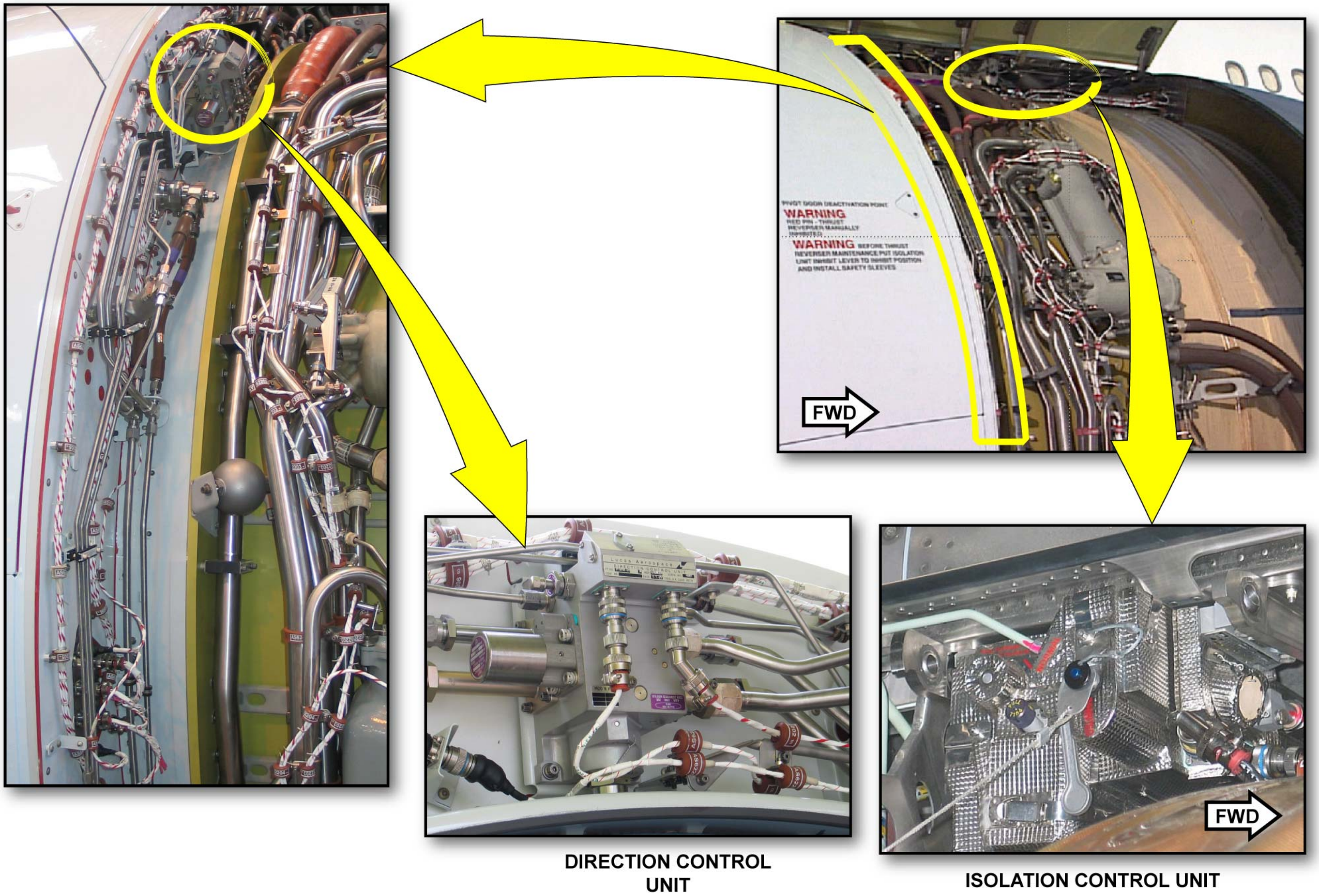
70 POWER PLANT RR TRENT 700 PRESENTATION (1)

COMPONENT LOCATION (continued)

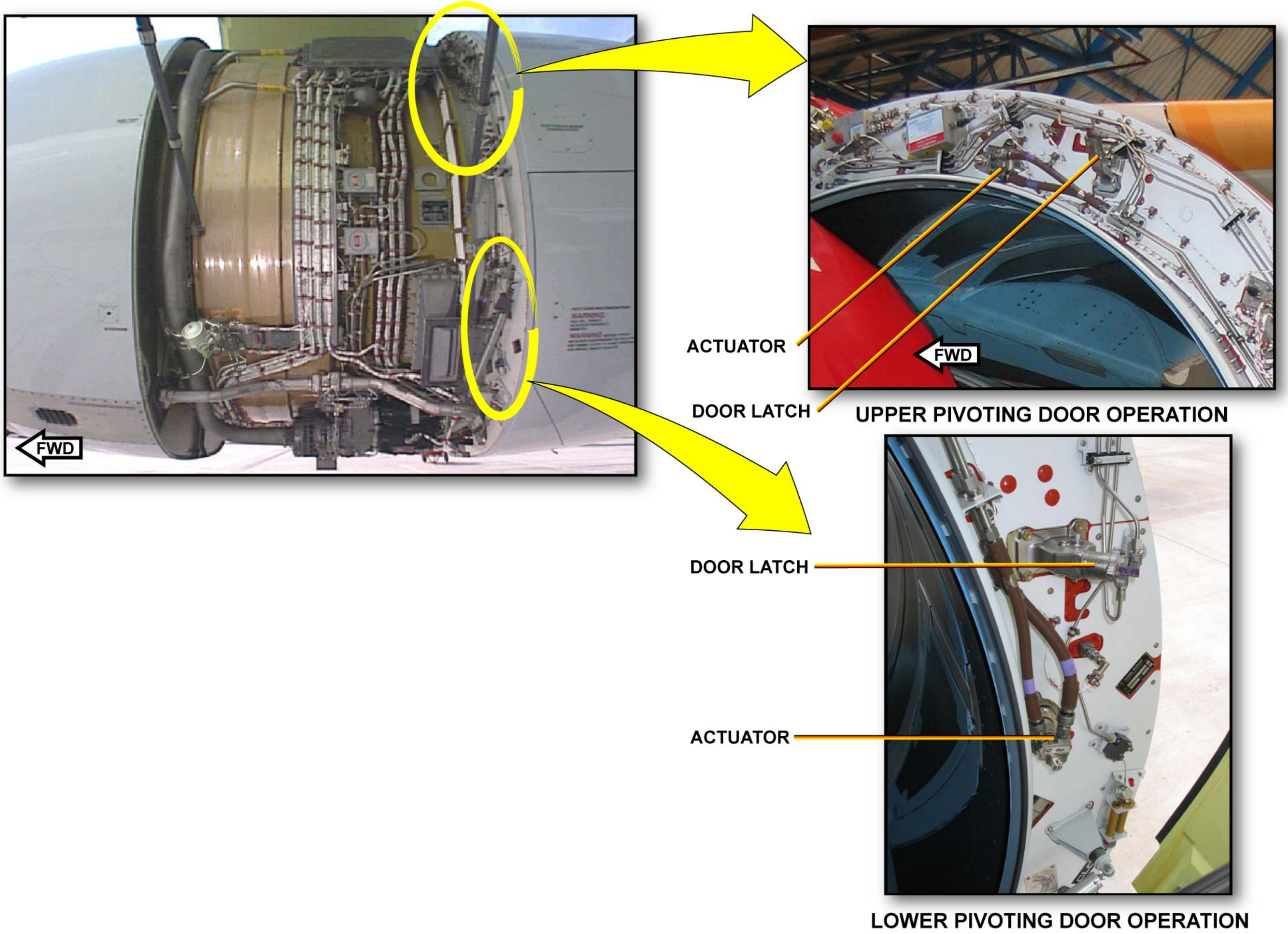
THRUST REVERSER

The Isolation Control Unit is installed on the pylon and the Direction Control Unit is installed in the front face of the RH side thrust reverser half.
The thrust reverser operating components for each side are installed in the front face of each thrust reverser half.

G6B08031 - G10T4T0 - FM70PB000000071



COMPONENT LOCATION - THRUST REVERSER



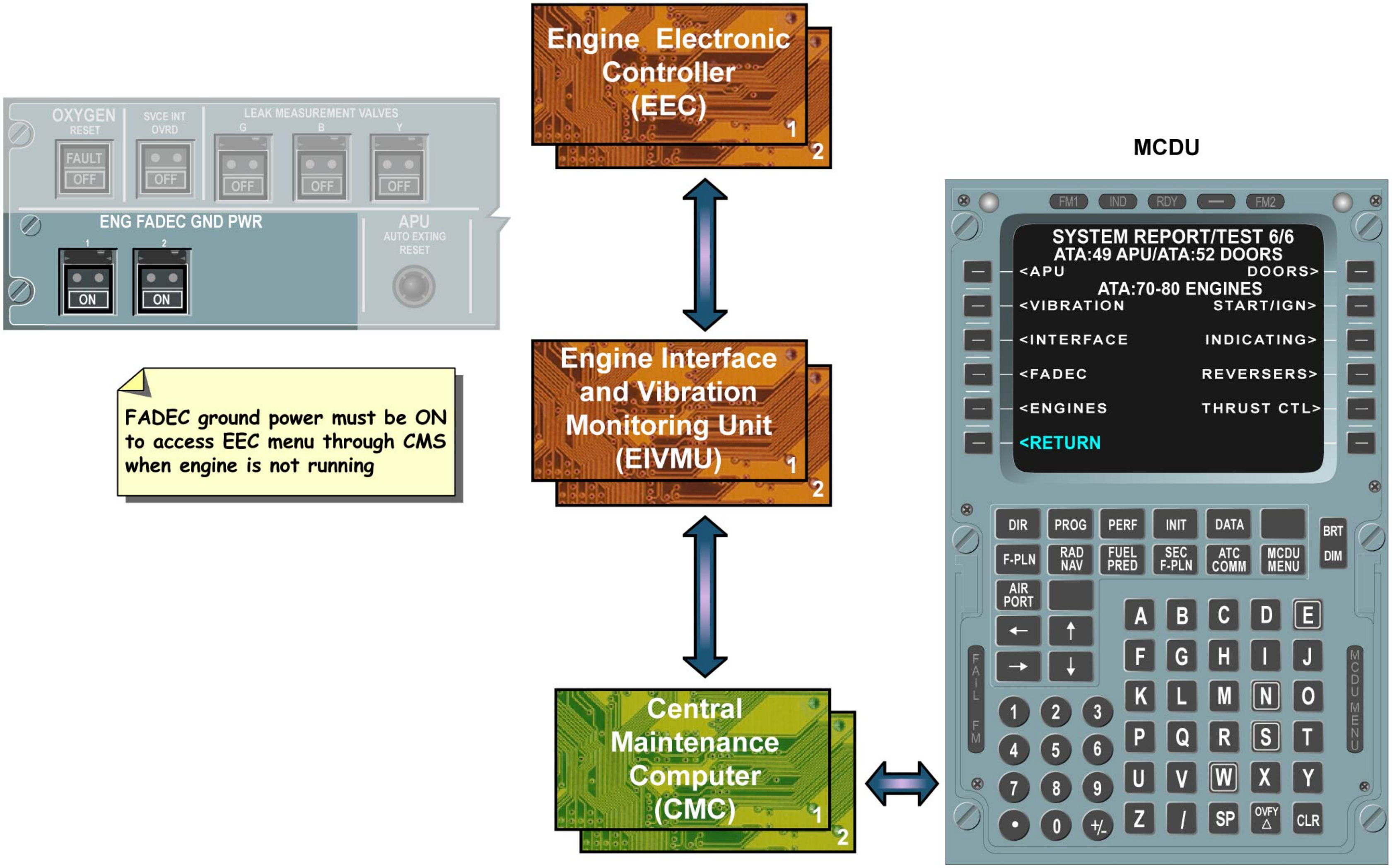
COMPONENT LOCATION - THRUST REVERSER

This Page Intentionally Left Blank

70 POWER PLANT RR TRENT 700 PRESENTATION (1)

MAINTENANCE/TEST FACILITIES

On the maintenance panel, the ENG FADEC GND PWR is used to supply the FADEC system for maintenance tasks, when the engines are not running. The MCDU is used to get access to the CMS f tests and for troubleshooting monitored components (computers, sensors, actuators).



MAINTENANCE/TEST FACILITIES

G6B08031 - G10T4T0 - FM70PB000000071

70 POWER PLANT RR TRENT 700 PRESENTATION (1)

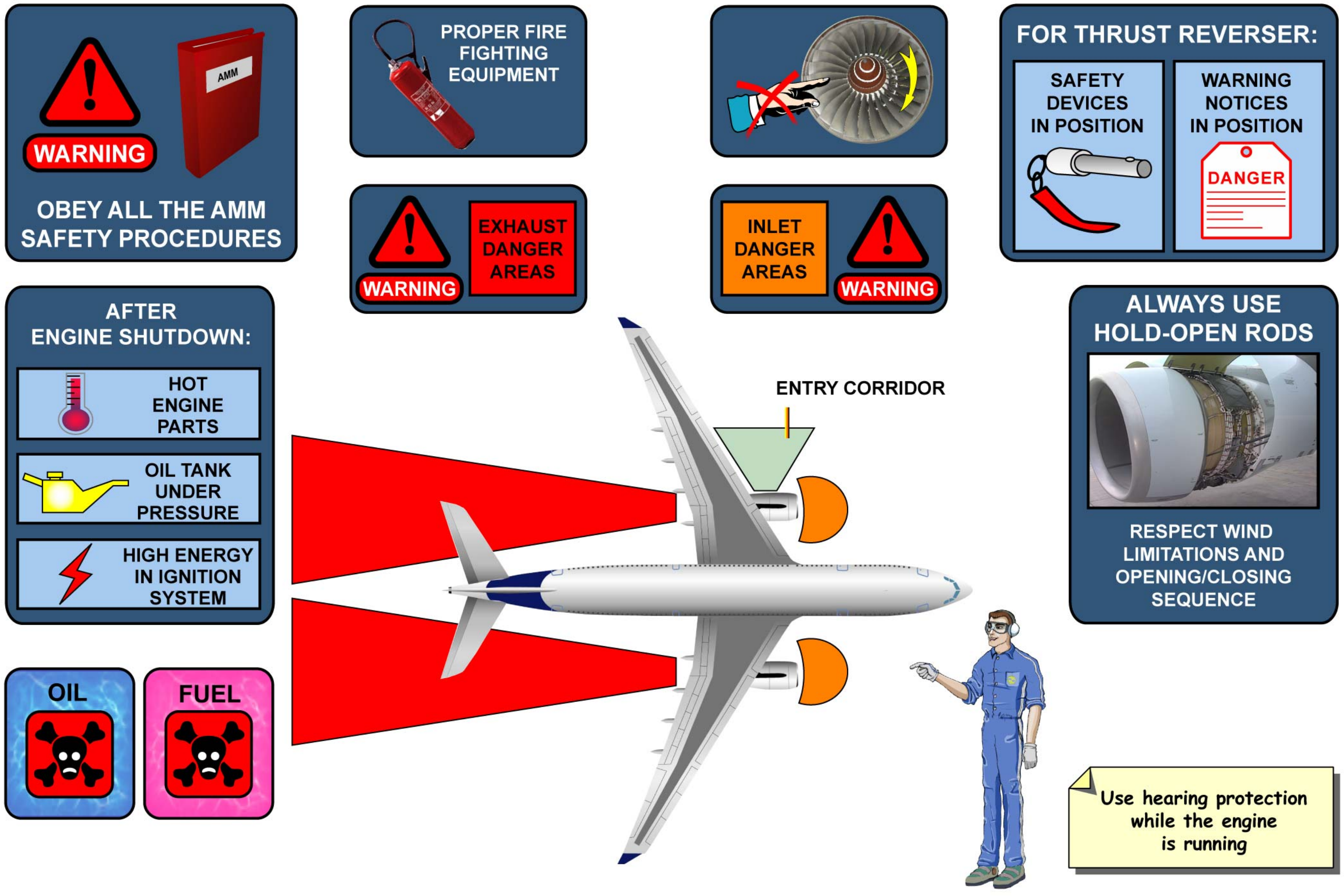
SAFETY PRECAUTIONS

When you work on aircraft, make sure that you obey all the AMM safety procedures. This will prevent injury to personnel and/or damage to the aircraft. Here is an overview of the main safety precautions related to the engines:

- make sure that all engine danger areas are as clear as possible to prevent damage to the engine, the aircraft or personnel in the area,
- make sure that you have fire-fighting equipment available,
- do not try to stop the fan from turning by hand,
- after engine shutdown, let the oil tank pressure bleed off a minimum of 5 minutes before you remove the tank filler cap. If you do not, pressurized oil can spray out of the tank and cause dangerous burns,
- the engine ignition system is an electrical system with high energy. Do not do maintenance on the ignition system while operating the engine. There is a danger of serious electrical shock. Make sure that the engine shutdown occurred a minimum of 5 minutes before you proceed,
- make sure that the thrust reverser is deactivated during maintenance. If not, the thrust reverser can operate accidentally and cause injury to personnel and/or damage to the reverser.

When opening the engine cowls:

- respect the wind limitations and the opening/closing sequence,
- always secure cowls with the hold-open rods,
- make sure that the slats are retracted and install a warning notice to prevent slat operation.



SAFETY PRECAUTIONS

70 POWER PLANT RR TRENT 700 PRESENTATION (1)

LUBRICANTS AND FUELS

The list of the materials required for the aircraft service and maintenance can be found in the Aircraft Maintenance Manual (AMM), chapter 20 STANDARD PRACTICES or ATA 70 for the engines.

WARNING: ALL SAFETY PRECAUTIONS MUST BE APPLIED.

AMM ATA 20 STANDARD PRACTICES
20-31-00 LIST OF MATERIALS REQUIRED FOR AIRCRAFT SERVICE AND MAINTENANCE

ITEM	DESIGNATION	MANUFACTURER REFERENCE
.	.	.
.	.	.
.	.	.
01-001	FUEL	JET A-1
01-003	FUEL	JP5
01-004	FUEL	TS1
01-006	FUEL	JP8

AMM ATA 70 STANDARD PRACTICES
70-30-00 (ENGINE) LIST OF MATERIALS
70-02-02 APPROVED ENGINE OILS

List of Approved Engine Oils

(a) Aeroshell Turbine Oil 555 (Royco Turbine Oil 555)

(b) BP Turbo Oil 2197 (formerly Exxon Turbine Oil 2197)

(c) Mobil Jet Oil II

(d) Mobil Jet Oil 254

(e) Mobil Jet Oil 291

70 POWER PLANT RR TRENT 700 PRESENTATION (1)

STORAGE AND PRESERVATION

Storage and preservation procedures must be applied for engines being not operated for a period of time according to the AMM. The preservation procedures protect the engine against corrosion, liquid and debris entering the engine, and atmospheric conditions during period of inactivity.

CAUTION: under no circumstances shall preservative oil or equivalent be sprayed into the engine inlet, core compressor or turbine, or engine exhaust. Dirt particles on wet blades and vanes may adversely affect engine performance during subsequent operation.

STORAGE AND PRESERVATION PROCEDURES MUST BE APPLIED FOR ENGINES BEING NOT OPERATED FOR A PERIOD OF TIME

PROTECTION AGAINST ATMOSPHERIC CONDITIONS

THE PRESERVATION PROCEDURES PROTECT THE ENGINE AGAINST CORROSION, LIQUID AND DEBRIS ENTERING THE ENGINE, AND ATMOSPHERIC CONDITIONS DURING PERIOD OF INACTIVITY

CAUTION

UNDER NO CIRCUMSTANCES SHALL PRESERVATIVE OIL OR EQUIVALENT BE SPRAYED INTO THE ENGINE INLET, CORE COMPRESSOR OR TURBINE, OR ENGINE EXHAUST. DIRT PARTICLES ON WETTED BLADES AND VANES MAY ADVERSELY AFFECT ENGINE PERFORMANCE DURING SUBSEQUENT OPERATION.

STORAGE AND PRESERVATION

G6B08031 - G10T4T0 - FM70PB000000071

70 POWER PLANT RR TRENT 700 PRESENTATION (1)

ENVIRONMENTAL PRECAUTIONS

Do not discharge products such as oil, fuel, solvent, lubricant either in trash bins, soil or into the water network (drains, gutters, rain water, waste water, etc...).
Sort waste fluids and use specific waste disposal containers.
Each product must be stored in an appropriate and specific cabinet or room such as a fire-resistant and sealed cupboard.

STORE PRODUCTS IN APPROPRIATE CONTAINER/CUPBOARD/ROOM

SORT WASTE FLUIDS IN CONTAINERS

AVOID FLUID SPILLAGE
USE APPROPRIATE STORAGE EQUIPMENT FOR CHEMICAL PRODUCTS

FLUID SPILL CLEANUP KIT

USE SPECIFIC WASTE DISPOSAL CONTAINERS

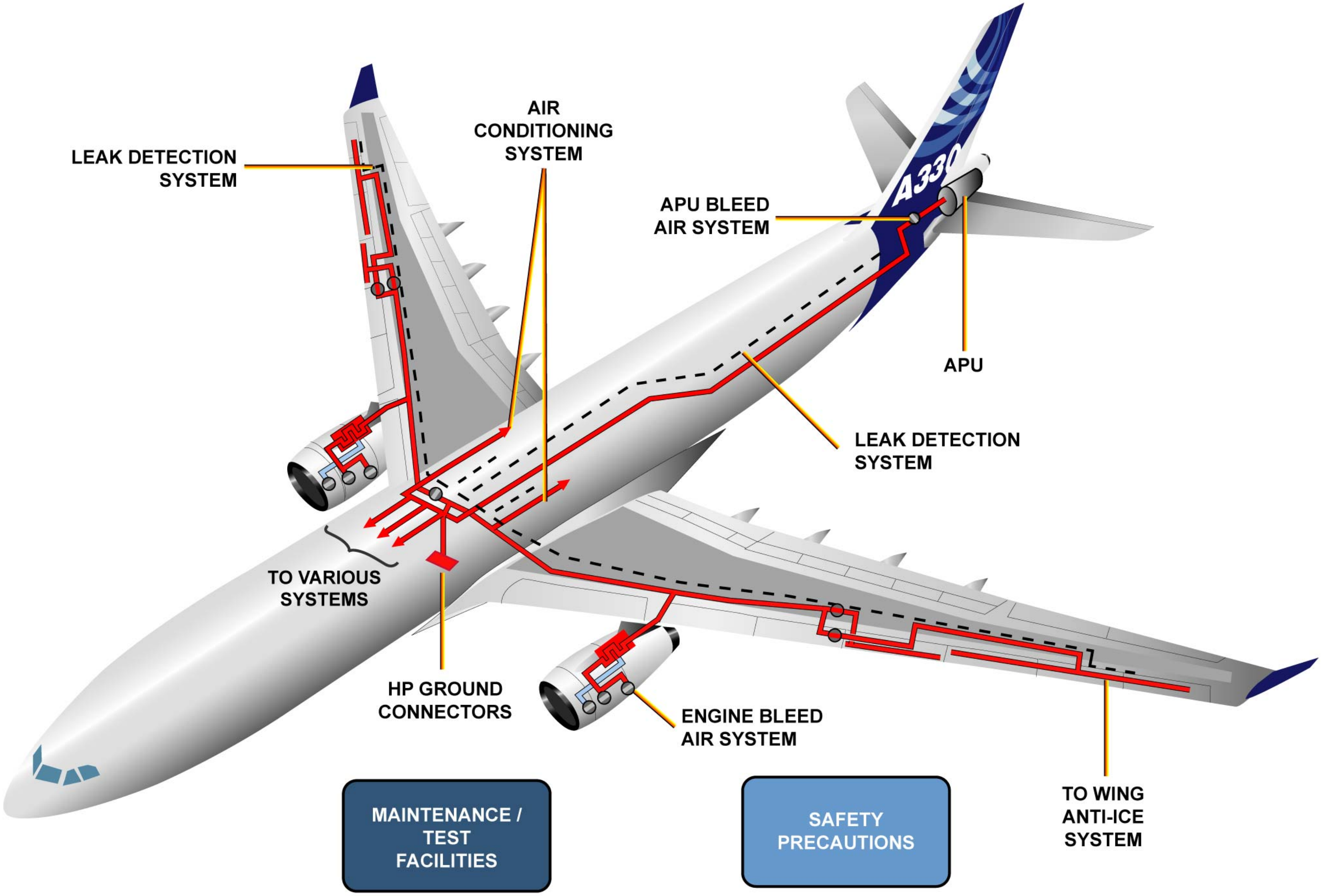
ENVIRONMENTAL PRECAUTIONS

36 PNEUMATIC SYS PRESENTATION (RR700) (1)

GENERAL

The pneumatic system is used to supply air to various A/C systems. This module describes:
- the system sources and users,
- the engine, APU and HP Ground Unit bleed air management system,
- the leak detection system,
- the control and indicating,
- the maintenance and test facilities.

When you work on A/C, you must obey all the safety procedures listed in the AMM.



GENERAL

G6B08031 - G10T4T0 - FM36P5000000003

36 PNEUMATIC SYS PRESENTATION (RR700) (1)

SOURCES AND USERS

The pneumatic system may be supplied with High Pressure (HP) bleed air from 3 types of sources:
- ground cart,
- APU,
- engines.

The bleed air is distributed to the different users via a distribution and supply ducting network. These users are:
- the water system pressurization,
- the hydraulic reservoir pressurization,
- the wing anti-icing system,
- the engines starting systems,
- the packs bay ventilation system,
- the air conditioning packs,

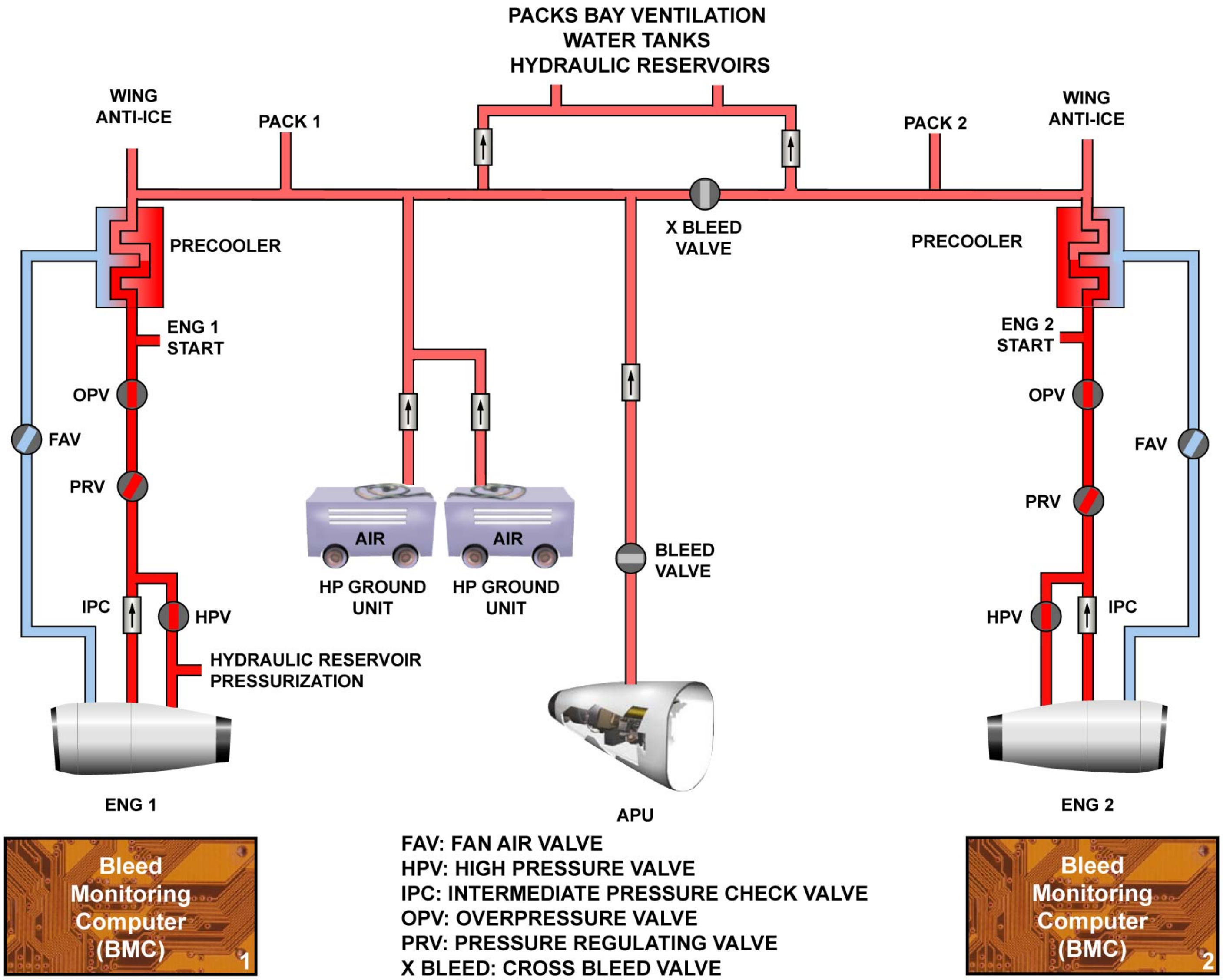
The pneumatic system operates pneumatically and is monitored by two Bleed Monitoring Computers (BMCs) one, two.
There is one BMC for each engine bleed system. Both BMCs exchange data. If one BMC fails, the other BMC takes over most of its monitoring functions.

ENGINE BLEED

The engine bleed air is pressure and temperature regulated prior to supplying the pneumatic system. Air is bled from the Intermediate Pressure Compressor (IPC) stage or the High Pressure Compressor (HPC) stage.
The HP bleed is only used when the engines are at low power. Once the IP bleed is sufficient, the High Pressure Valve (HPV) closes.
All the engine bleed air is supplied to the pneumatic system through the main engine BLEED valve (or Pressure Regulating Valve (PRV)), which acts as a shut off and overall system pressure regulating valve.
Each BMC monitors system pressure and will shut down the engine bleed in case of excessive pressure. In addition, an overpressure valve (OPV) is installed downstream from the bleed valve to protect the system in case of overpressure.
The temperature of the engine bleed air is regulated to a maximum value. The hot bleed air goes through an air-to-air heat exchanger called the precooler. Fan discharge air modulated by the Fan Air Valve (FAV), blows across the precooler to maintain the temperature within limits.

APU BLEED/HP GROUND UNIT BLEED

A crossbleed duct connects the left and right bleed systems. A crossbleed valve enables their interconnection or isolation.
The APU can also be used for bleed air supply. This is usually done on the ground for air conditioning and for engine start. However, APU BLEED air could also be used in flight, depending on altitude. The APU bleed supply is connected to the left side of the crossbleed duct.
On the ground, a HP ground power unit can be connected to the left side pneumatic system. The right side may be supplied by opening the crossbleed valve.



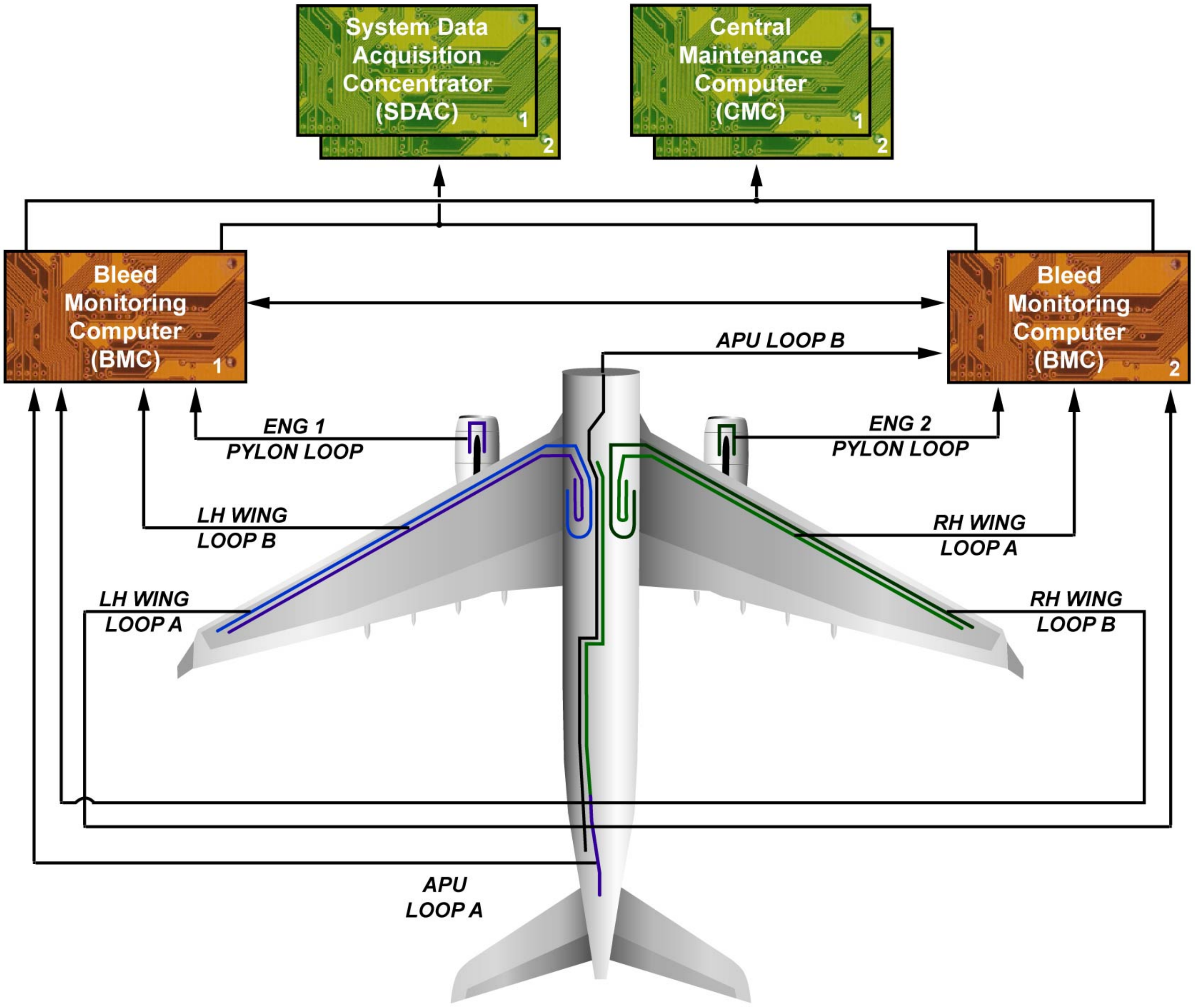
SOURCES AND USERS - ENGINE BLEED & APU BLEED/HP GROUND UNIT BLEED

36 PNEUMATIC SYS PRESENTATION (RR700) (1)

LEAK DETECTION

Leak detection loops are installed along the hot air supply ducts of the pneumatic system. The loops are made of multiple sensing elements connected in series. A dual loop detection system is installed in the wings, the mid fuselage above the air conditioning packs area and on the APU bleed duct. Two loops A and B are routed in parallel along the air ducts. An "AND" logic ensures the interconnection of the loops in the BMCs to prevent spurious warnings. In each engine pylon, a single detection loop ensures the leak detection.

The leak detection loops are connected to the BMCs. If a leak is detected, a signal is sent to the BMC one, or two, which automatically isolates the affected area, triggers a warning signal to the ECAM system through the System Data Acquisition Concentrator (SDAC) and sends a fault message to the Central Maintenance Computer (CMC).



LEAK DETECTION

36 PNEUMATIC SYS PRESENTATION (RR700) (1)

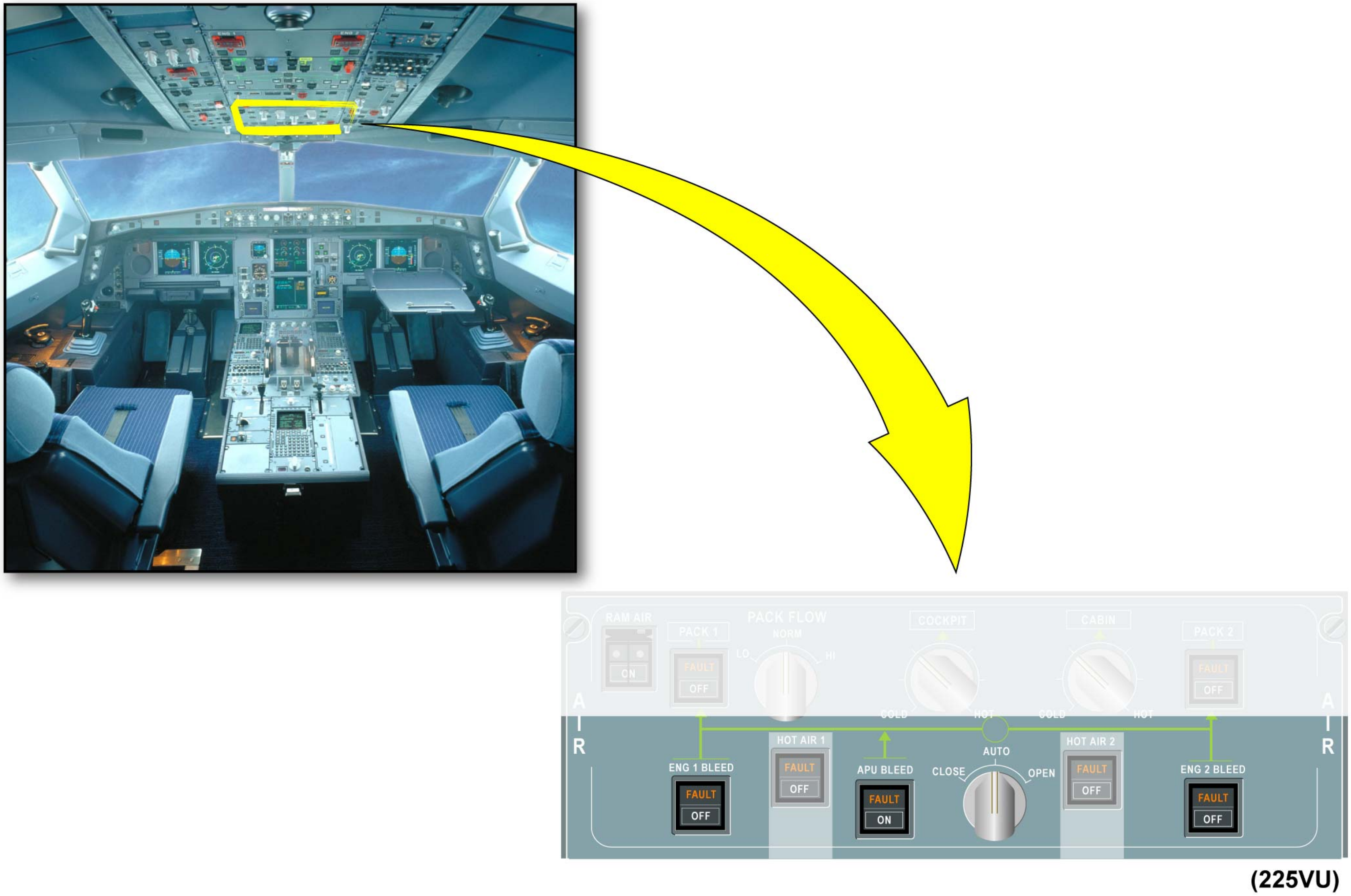
CONTROL AND INDICATING

This section highlights the control panels and indications for the pneumatic system.

CONTROL PANEL

Controls for the pneumatic system are part of the AIR COND panel, located on the overhead panel.

G6B08031 - G10T4T0 - FM36P5000000003



CONTROL AND INDICATING - CONTROL PANEL

G6B08031 - G10T4T0 - FM36P5000000003

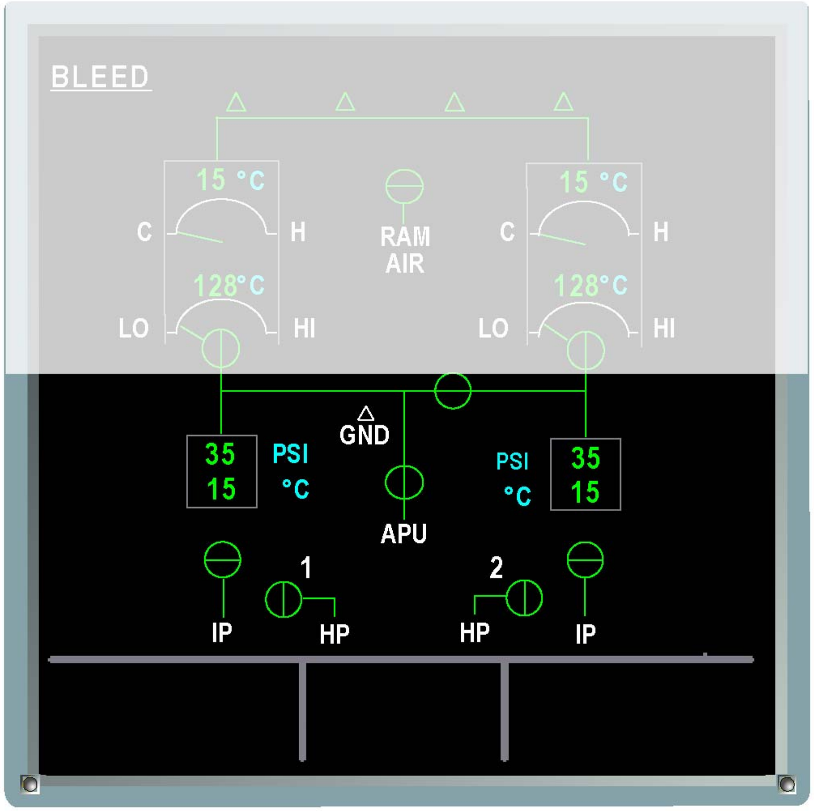
36 PNEUMATIC SYS PRESENTATION (RR700) (1)

CONTROL AND INDICATING (continued)

ECAM INDICATION

The pneumatic system indications are displayed on the lower part of the ECAM BLEED page.

G6B08031 - G10T4T0 - FM36P5000000003



ECAM SYSTEM DISPLAY (SD)

G6B08031 - G10T4T0 - FM36P5000000003

CONTROL AND INDICATING - ECAM INDICATION

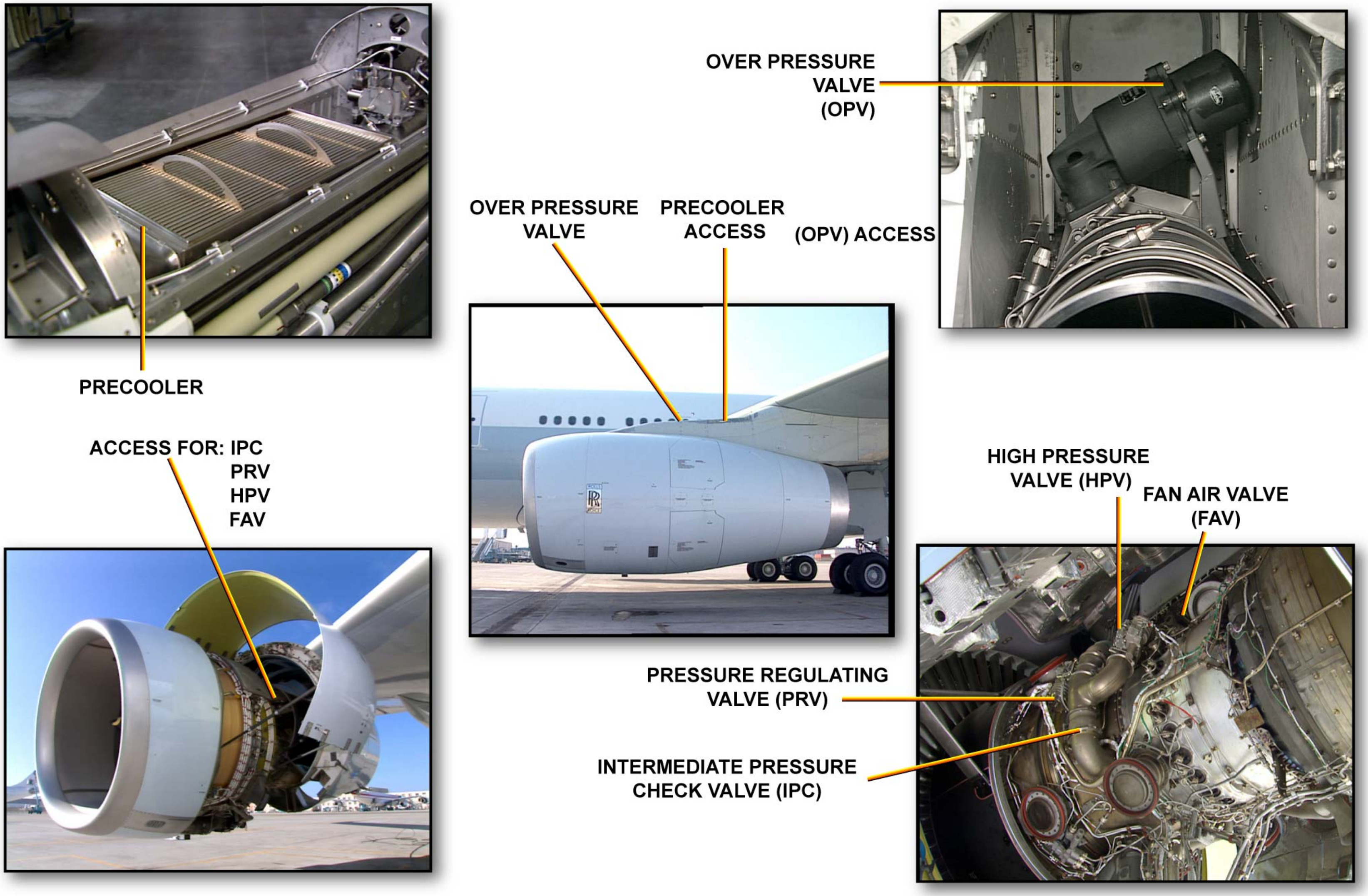
36 PNEUMATIC SYS PRESENTATION (RR700) (1)

COMPONENT LOCATION

The main components of the pneumatic system are located on the engines and in the pylons.

ENGINE BLEED COMPONENTS

The IPC, the High Pressure Valve (HPV), the PRV, the FAV are located on the engine. The OPV and the precooler are located in the pylon.



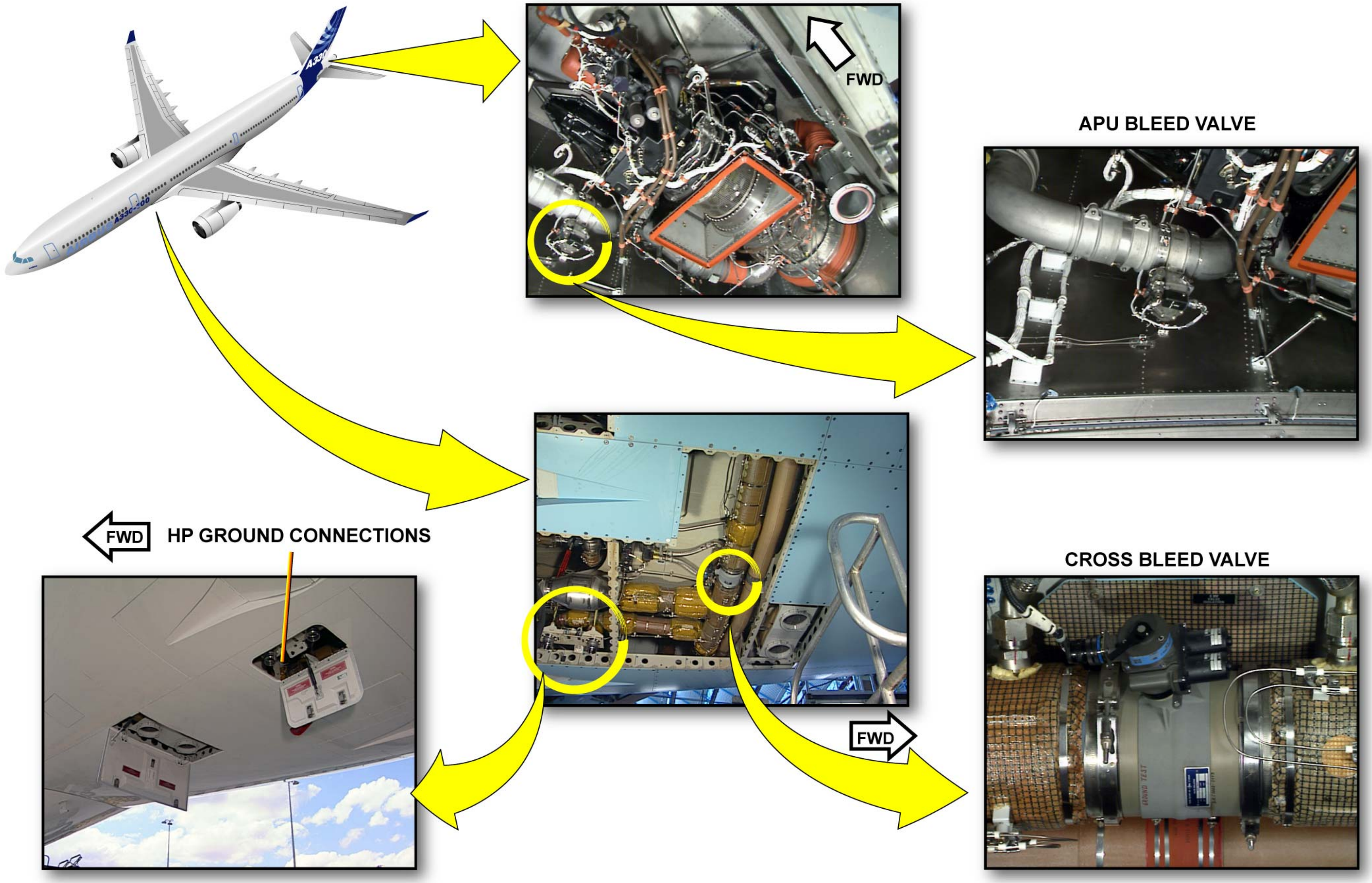
COMPONENT LOCATION - ENGINE BLEED COMPONENTS

36 PNEUMATIC SYS PRESENTATION (RR700) (1)

COMPONENT LOCATION (continued)

APU AND X BLEED COMPONENTS

The crossbleed valve is located in the forward section of the lower fuselage belly fairing area. Get access to the HP ground connector through a small access door located on the lower fuselage belly fairing. The APU bleed valve is located on the APU.



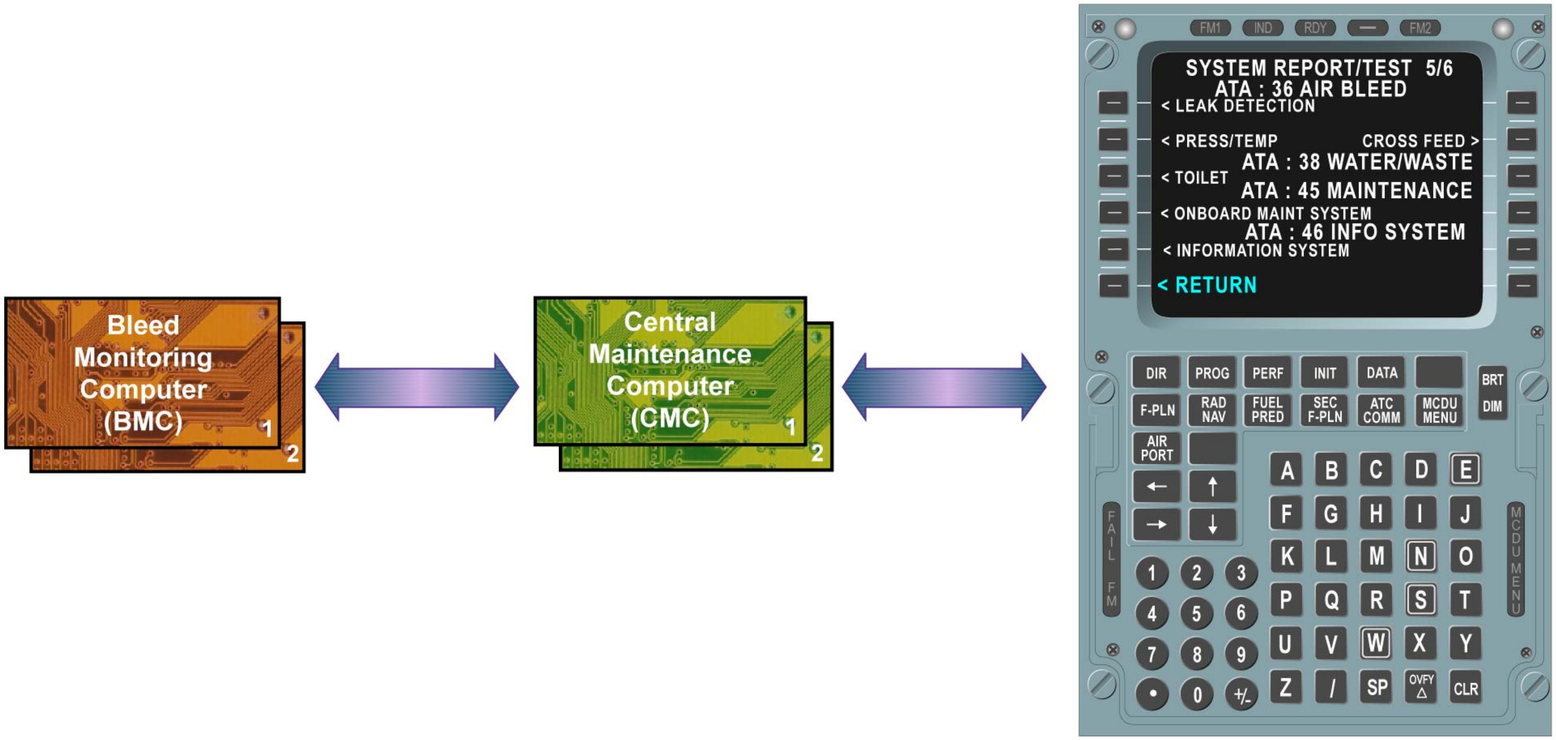
COMPONENT LOCATION - APU AND X BLEED COMPONENTS

G6B08031 - G10T4T0 - FM36P5000000003

36 PNEUMATIC SYS PRESENTATION (RR700) (1)

MAINTENANCE/TEST FACILITIES

The CMCs let the maintenance crew read the failure data in the BMCs BITE via the MCDUs.



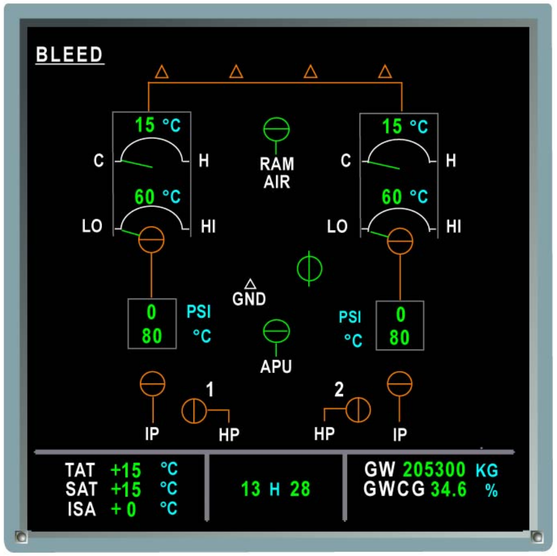
MAINTENANCE/TEST FACILITIES

36 PNEUMATIC SYS PRESENTATION (RR700) (1)

SAFETY PRECAUTIONS

When you work on A/C, make sure that you obey all the AMM safety procedures. This will prevent injury to persons and/or damage to the A/C.
Here is an overview of the main safety precautions relative to the pneumatic system.
Make sure that the pneumatic system is depressurized before starting the work as pressurized air can cause unwanted pressurization of the A/C, and injury to personnel.
Parts can be hot for 1 hour after engine shutdown. Do not touch them until they are sufficiently cool.

PARTS CAN REMAIN HOT
FOR 1 HOUR AFTER
ENGINE SHUTDOWN.



ECAM BLEED PAGE

WARNING

MAKE SURE THAT THE PNEUMATIC SYSTEM IS
DEPRESSURIZED BEFORE STARTING THE WORK.
COMPRESSED AIR CAN CAUSE UNWANTED
PRESSURIZATION OF THE AIRCRAFT
AND INJURY TO PERSONNEL.

SAFETY PRECAUTIONS

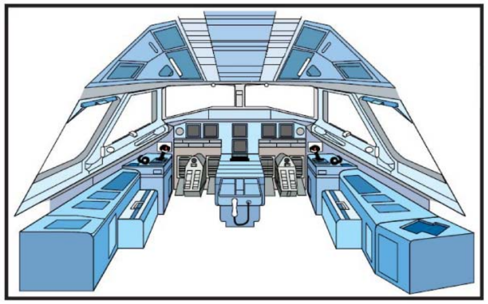
G6B08031 - G10T4T0 - FM36P5000000003

21 AIR CONDITIONING SYSTEM PRESENTATION (1)

GENERAL

The air conditioning system maintains the air in the pressurized fuselage areas at the correct level of pressure, temperature and freshness. The pressurized areas are:
- the cockpit,
- the 6 zones of the passenger cabin,
- the lavatories and galleys areas,
- the crew rest compartments, when installed,
- the avionics compartment,
- the FWD, AFT and BULK cargo compartments.

The air conditioning system also carries out the ventilation of the air conditioning bay, which is a non-pressurized area
Air supply comes from the pneumatic system. Then, air is regulated in temperature by the temperature regulation sub-system. Correct level of air freshness in the pressurized areas and proper ventilation of the avionics equipment are done by the ventilation sub-system. The pressurization sub-system makes sure that the cabin altitude complies with crew and passengers comfort.


COCKPIT

FWD, MID, AFT CABIN

LAVATORIES AND GALLEYS

AVIONICS COMPARTMENT

FWD CARGO

AFT CARGO

BULK CARGO

CREW REST COMPARTMENT

NON PRESSURIZED AREA

AIR CONDITIONING BAY VENTILATION

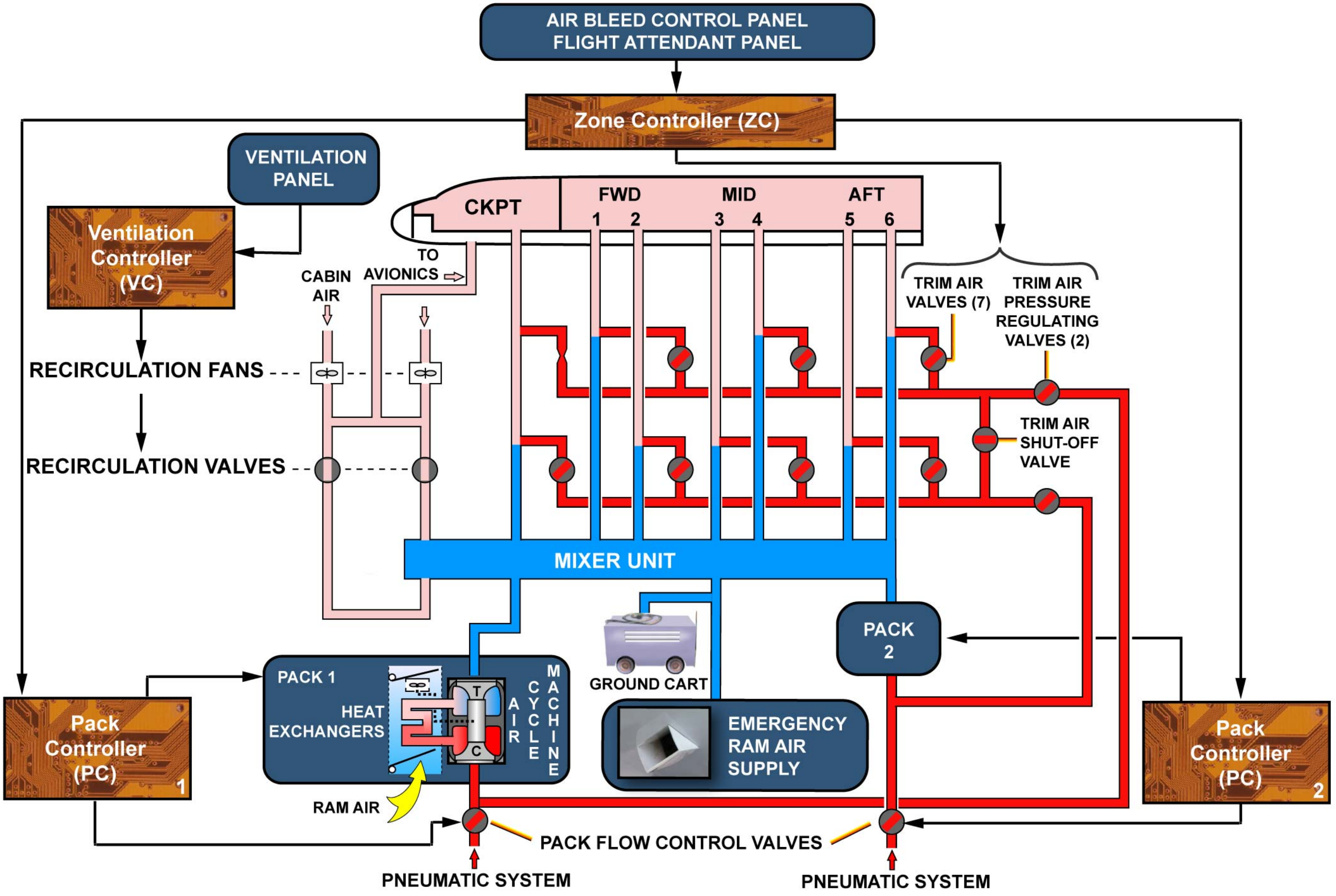
BLEED AIR → TEMPERATURE REGULATION → DISTRIBUTION & VENTILATION → PRESSURIZATION

GENERAL

21 AIR CONDITIONING SYSTEM PRESENTATION (1)

TEMPERATURE CONTROL AND RE-CIRCULATION

Bleed air coming from the pneumatic system is first regulated in flow by two pack flow control valves controlled by the Pack Controllers (PCs) according to flow demand inputs received from the AIR panel and the Zone Controller (ZC).
Bleed air is then delivered to two independent air conditioning packs, which ensure basic temperature regulation. Each air conditioning pack mainly has an Air Cycle Machine (ACM) and heat exchangers using ram air flowing through ram air inlet and ram air outlet flaps. Pack temperature regulation is controlled by the related PC according to a temperature demand computed by the ZC based upon inputs received from the AIR panel and the Flight Attendant Panel (FAP).
The cooled fresh air is then fed into a mixer unit.
On ground, a ground cart supplies preconditioned air through Low Pressure (LP) ground connectors. In flight, if both packs are inoperative, an emergency ram air inlet will help to maintain air supply to the cabin. The emergency ram air supply is directly controlled from the AIR panel.
Fine temperature adjustment of air distributed in the pressurized zones is obtained by controlling the amount of hot air added to the air coming from the mixer unit. This air temperature adjustment is done under the control of the ZC according to the temperature demand inputs received from the AIR panel and the FAP.
A part of cabin air is re-circulated by re-circulation fans through re-circulation valves in order to limit the bleed air demand on the engines. This re-circulated air is mixed with fresh air coming from the air conditioning packs into the mixer unit. Re-circulated air is also used for avionics ventilation. The re-circulation fans and valves are controlled by the Ventilation Controller (VC). The re-circulation fans can be manually switched off from the VENTILATION panel.



TEMPERATURE CONTROL AND RE-CIRCULATION

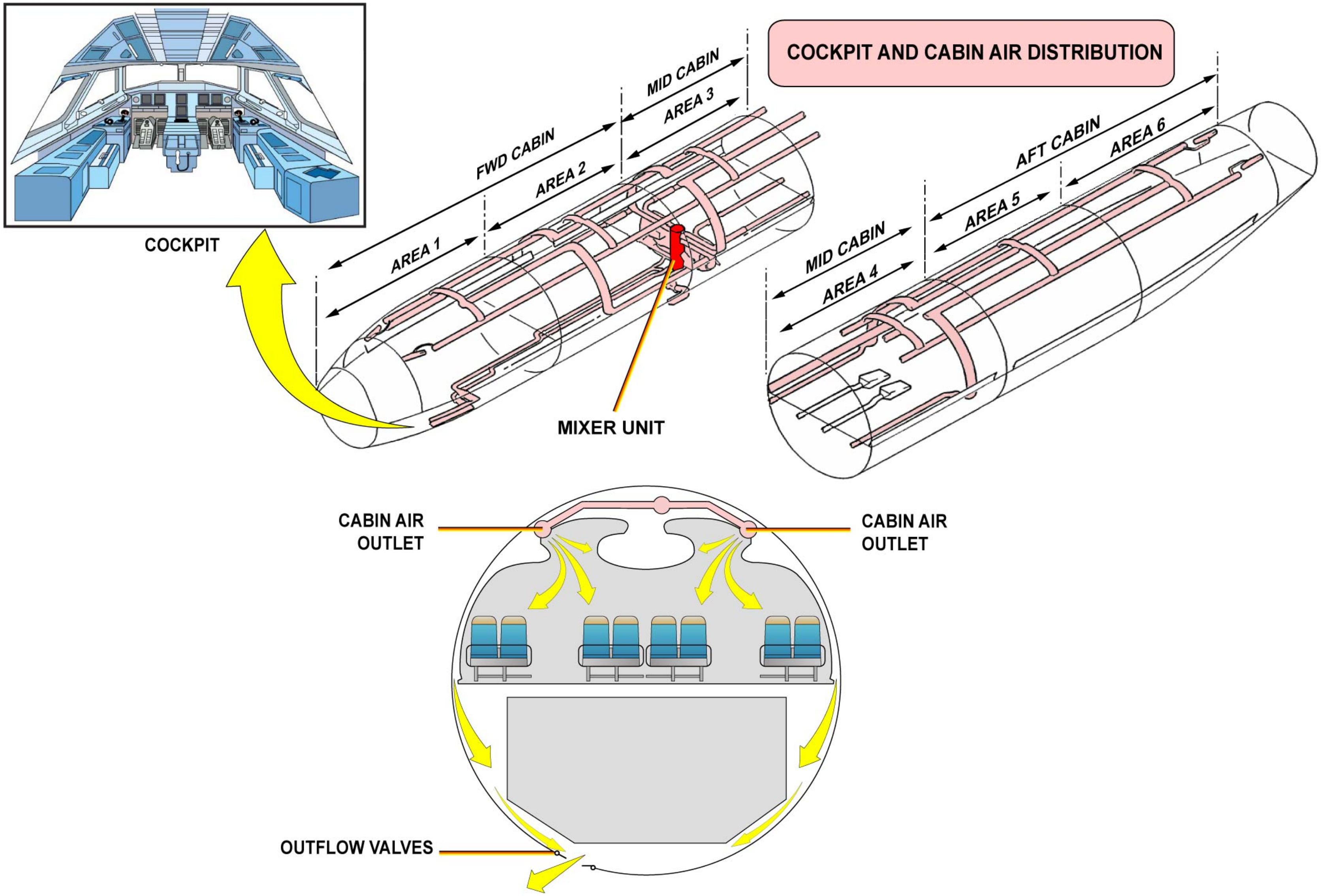
21 AIR CONDITIONING SYSTEM PRESENTATION (1)

AIR DISTRIBUTION AND VENTILATION

COCKPIT AND CABIN AIR DISTRIBUTION

Air coming from the mixer unit is supplied to six passenger cabins zones and to the cockpit.
Part of cabin air that is not re-circulated is discharged overboard through the outflow valves of the pressurization system.

G6B08031 - G10T4T0 - FM21PA000000001



AIR DISTRIBUTION AND VENTILATION - COCKPIT AND CABIN AIR DISTRIBUTION

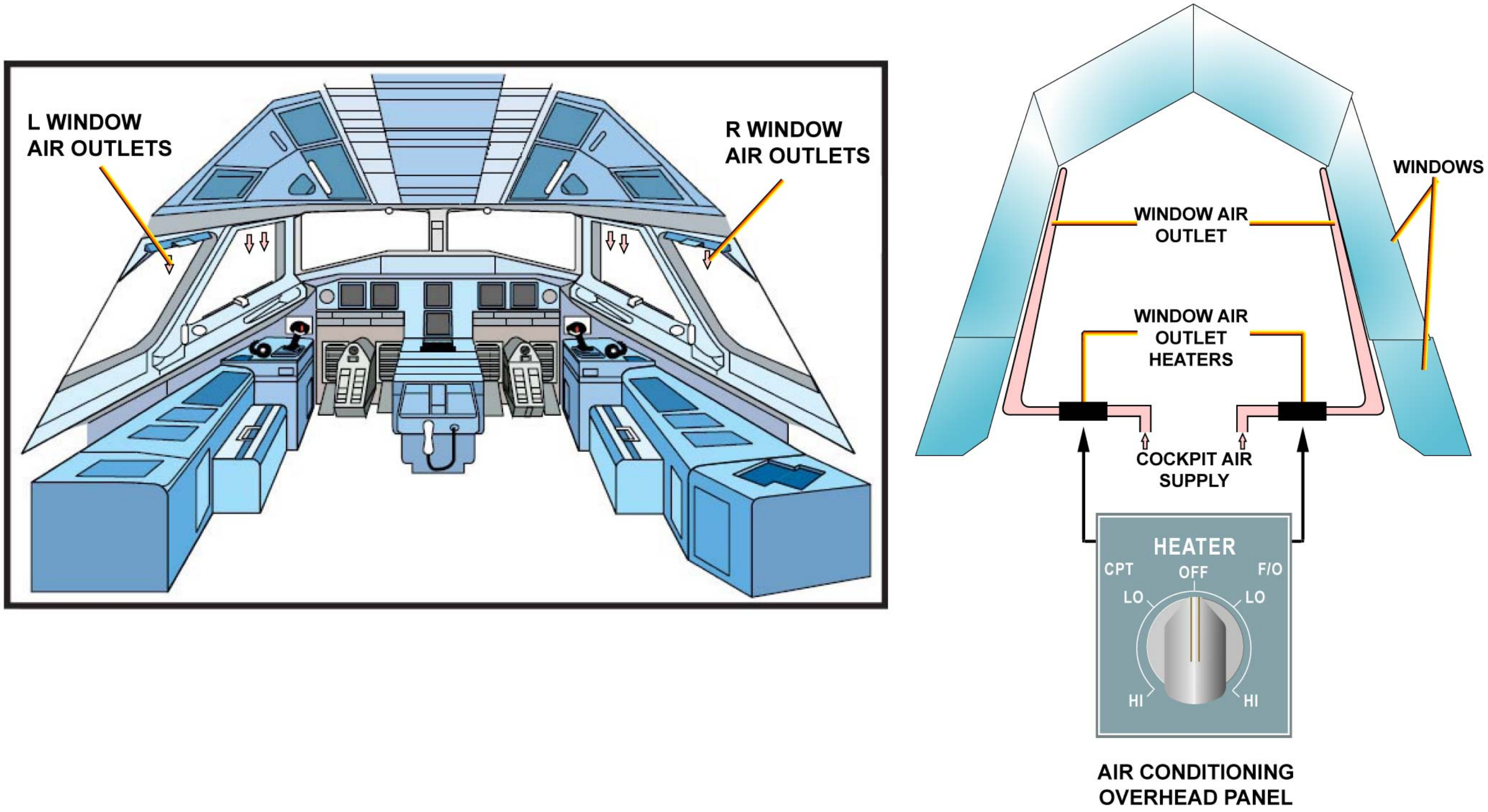
21 AIR CONDITIONING SYSTEM PRESENTATION (1)

AIR DISTRIBUTION AND VENTILATION (continued)

COCKPIT SIDE WINDOWS AIR OUTLET ELECTRICAL HEATING (OPTIONAL)

To improve the pilot's comfort, additional heating for cockpit side-window air outlet is installed. Cockpit temperature-regulated air supply is heated using two electrical heaters: one for the captain, the other for the First Officer (F/O). Temperature control is achieved via the overhead panel rotary selector.

COCKPIT SIDE WINDOWS AIR OUTLET ELECTRICAL HEATING (OPTIONAL)



G6B08031 - G10T4T0 - FM21PA000000001

AIR DISTRIBUTION AND VENTILATION - COCKPIT SIDE WINDOWS AIR OUTLET ELECTRICAL HEATING (OPTIONAL)

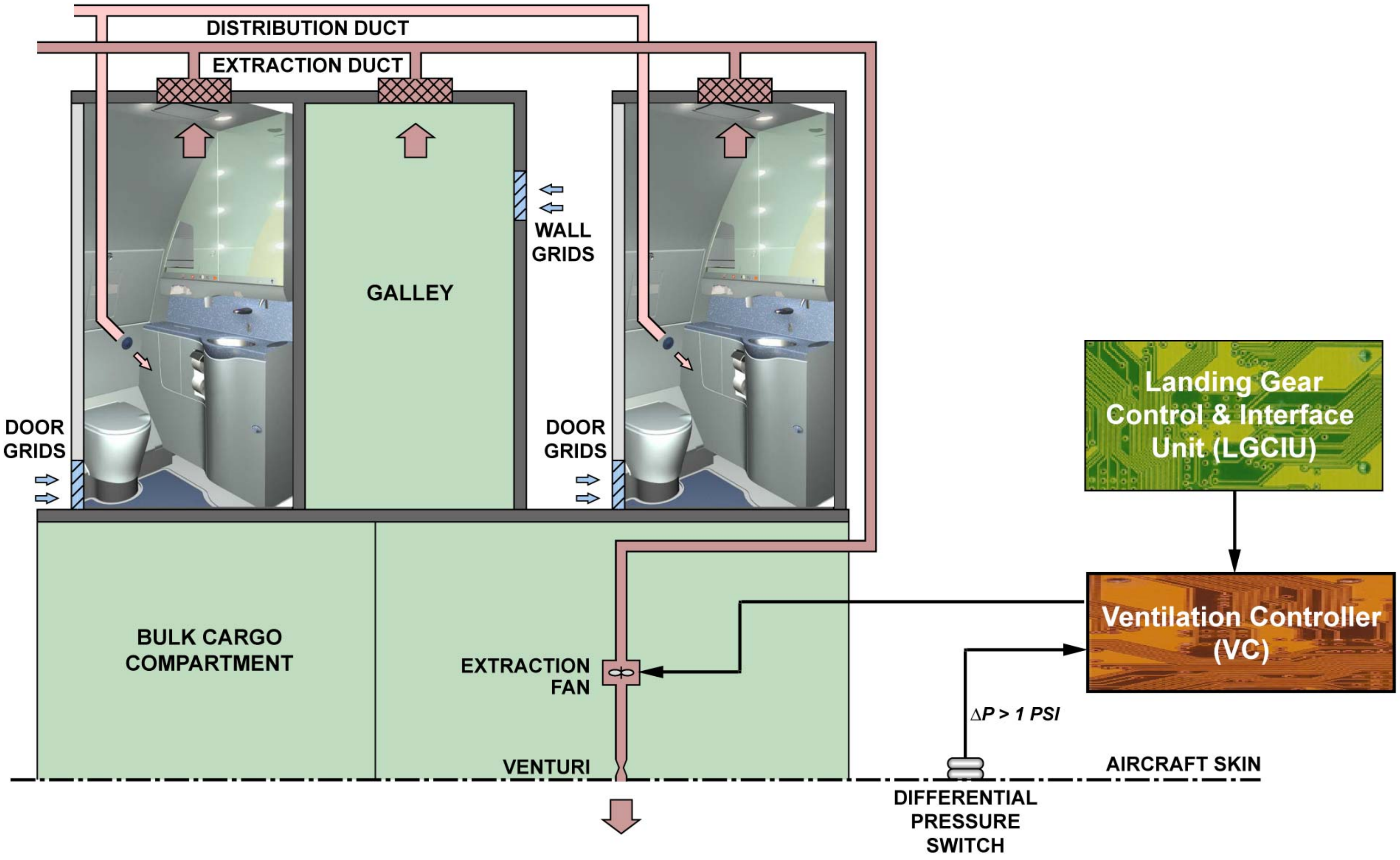
21 AIR CONDITIONING SYSTEM PRESENTATION (1)

AIR DISTRIBUTION AND VENTILATION (continued)

LAVATORY AND GALLEY AIR EXTRAXTION

The lavatory and galley ventilation air is ducted from the main cabin air distribution supply. The air is then extracted and discharged overboard by differential pressure during flight, or by an extraction fan when aircraft is on ground. The extraction fan is controlled and monitored by the VC.

LAVATORY AND GALLEY AIR EXTRACTION



AIR DISTRIBUTION AND VENTILATION - LAVATORY AND GALLEY AIR EXTRAXTION

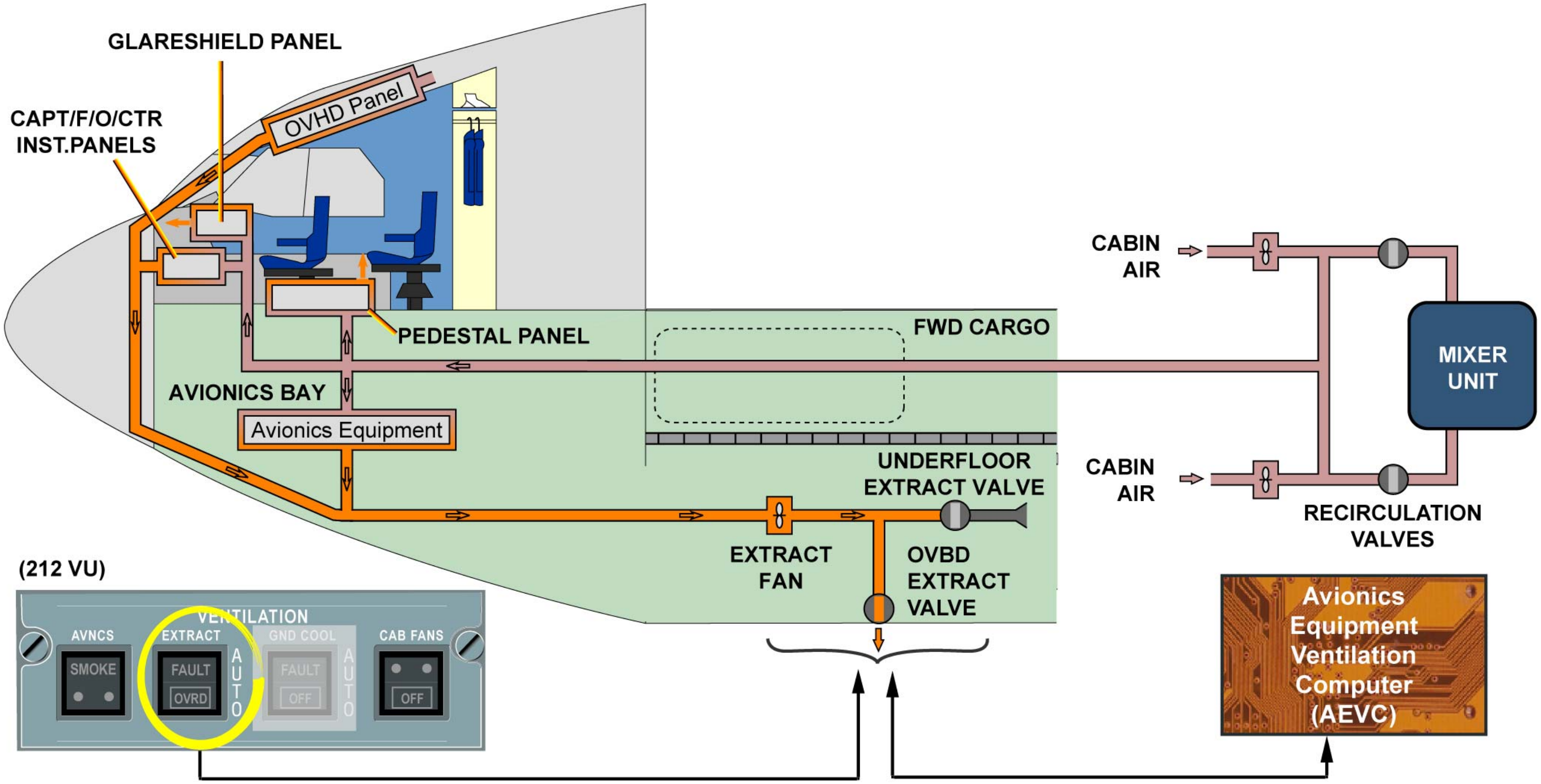
21 AIR CONDITIONING SYSTEM PRESENTATION (1)

AIR DISTRIBUTION AND VENTILATION (continued)

AVIONICS COMPT VENTILATION

The two re-circulation fans used for cabin air re-circulation are also used as blower fans for the avionics equipment ventilation. The system carries out proper ventilation of the rack equipment and various panels in order to avoid any overheat condition. It operates continuously whenever aircraft electrical power is available. An extract fan extracts the air from the avionics equipment ventilation. Air is discharged either overboard through the overboard valve or under the cargo floor through the underfloor valve. When the overboard valve is open, the underfloor valve is closed and vice versa. The Avionics Equipment Ventilation Computer (AEVC) controls and monitors the avionics ventilation system. A manual override is possible from the VENTILATION panel.

AVIONICS EQUIPMENT VENTILATION



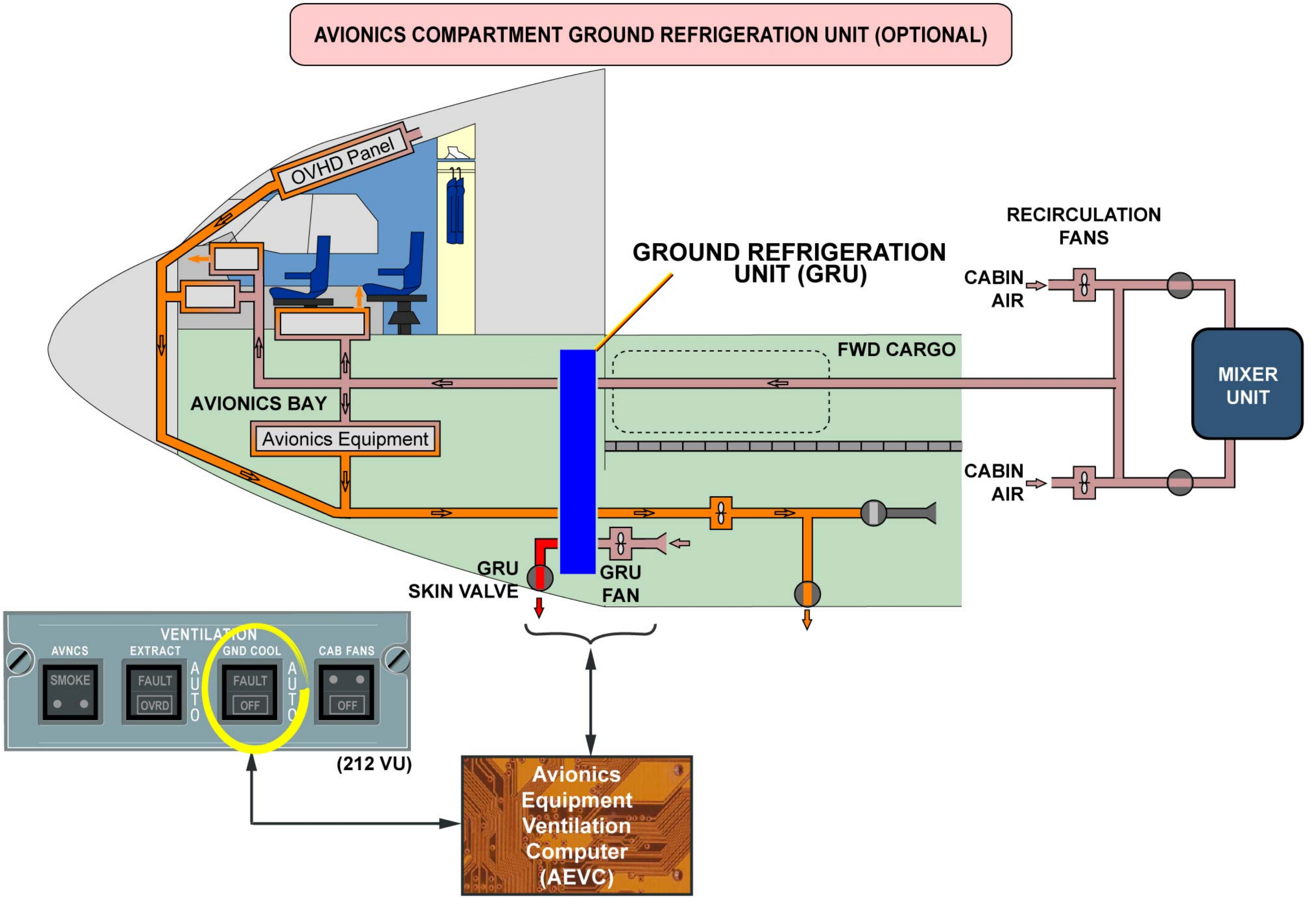
AIR DISTRIBUTION AND VENTILATION - AVIONICS COMPT VENTILATION

21 AIR CONDITIONING SYSTEM PRESENTATION (1)

AIR DISTRIBUTION AND VENTILATION (continued)

AVIONICS COMPT GROUND REFRIGERATION UNIT (OPTIONAL)

The Ground Refrigeration Unit (GRU) supplies additional cooling to the avionics compartment when the aircraft is on the ground under high ambient temperature conditions. The system only works with air conditioning Packs selected off. The GRU cools the air coming from the cabin air re-circulation system before sending it to distribution into the avionics compartment and the cockpit panels. The system comprises a GRU, a fan and a skin valve. The system is monitored and controlled by the AEVC and may be manually controlled from the VENTILATION panel.



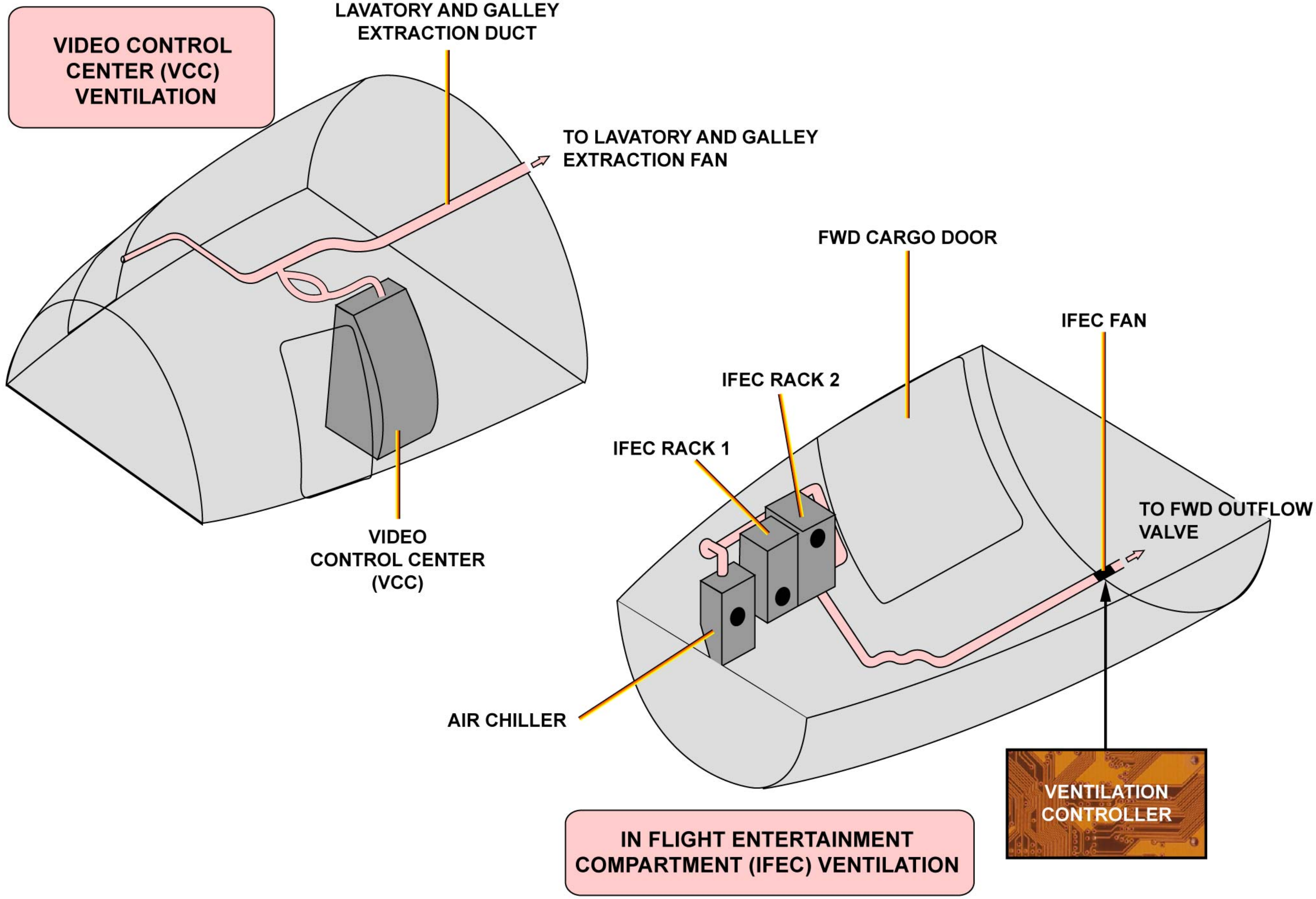
AIR DISTRIBUTION AND VENTILATION - AVIONICS COMPT GROUND REFRIGERATION UNIT (OPTIONAL)

21 AIR CONDITIONING SYSTEM PRESENTATION (1)

AIR DISTRIBUTION AND VENTILATION (continued)

IFEC AND VCC VENTILATION

The Video Control Center (VCC) ventilation system uses cabin air, which is then extracted through the lavatory and galley air extraction system.
The In Flight Entertainment Compartment (IFEC) ventilation system uses avionics compartment air, which is then extracted by an extract fan. The IFEC ventilation system is controlled and monitored by the VC.



AIR DISTRIBUTION AND VENTILATION - IFEC AND VCC VENTILATION

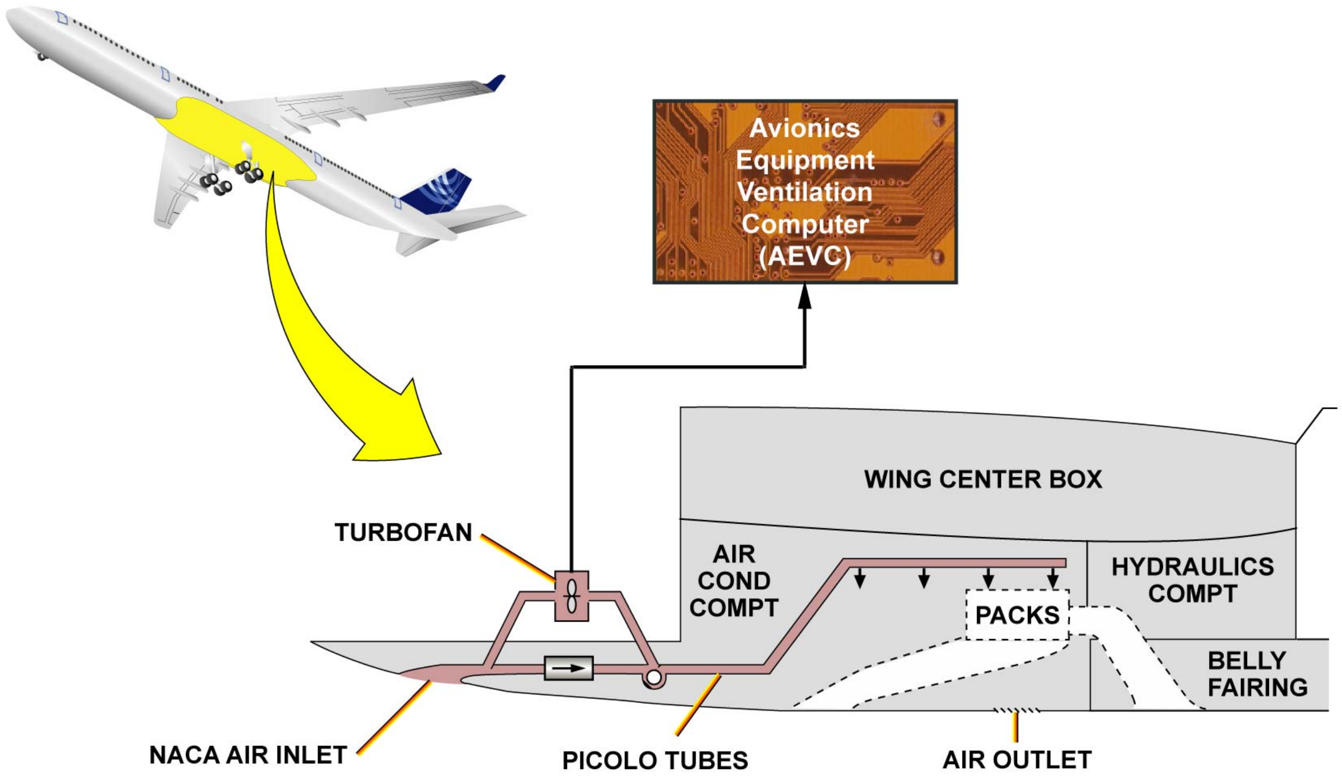
21 AIR CONDITIONING SYSTEM PRESENTATION (1)

AIR DISTRIBUTION AND VENTILATION (continued)

AIR CONDITIONING COMPARTMENT VENTILATION

The air conditioning bay is ventilated by external air to maintain temperature compatible with structure constraints in the relevant area. On ground, when the air conditioning packs operate, a turbofan boosts the air into the ventilation circuit. In flight, the ventilation is done by ram air from NACA air inlet. The system is monitored by the AEVC.

AIR CONDITIONING COMPARTMENT VENTILATION

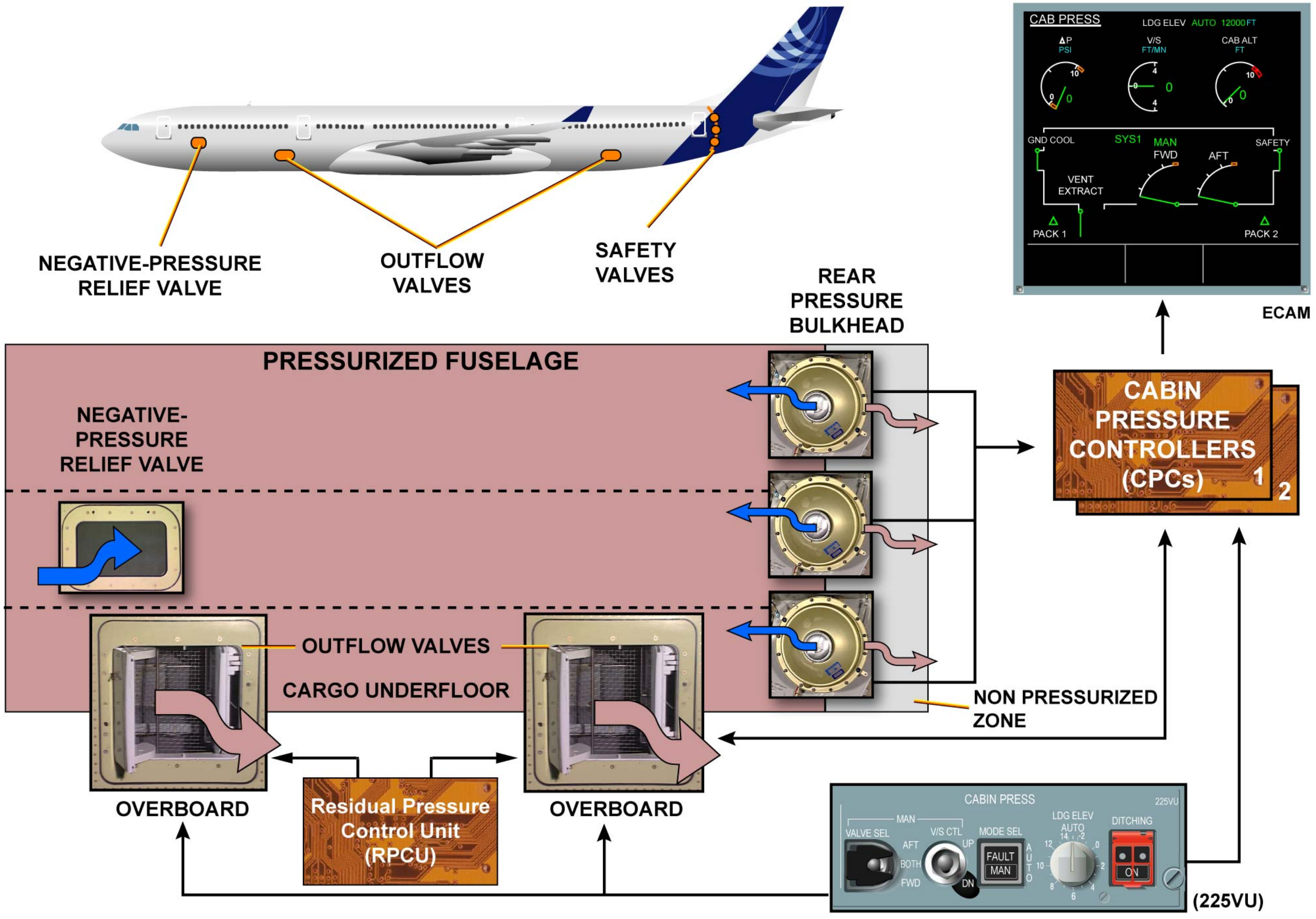


AIR DISTRIBUTION AND VENTILATION - AIR CONDITIONING COMPARTMENT VENTILATION

21 AIR CONDITIONING SYSTEM PRESENTATION (1)

PRESSURIZATION

The pressurization system makes sure that cabin altitude is safe and compatible with crew and passenger comfort. The cabin pressurization is done by controlling the amount of cabin air discharged overboard through two outflow valves located on the lower part of the aircraft fuselage. The system is controlled automatically by the Cabin Pressure Controllers (CPCs), or manually from the CABIN PRESS panel.
When the aircraft is on ground, the Residual Pressure Control Unit (RPCU) forces both outflow valves to move to the fully open position, overriding the automatic control from CPCs and the manual control as well. This is to prevent any violent door opening in case of residual cabin pressure.
Three safety valves are installed at the rear pressure bulkhead to prevent excessive positive or negative differential pressure. Due to the large volume of the fuselage, one negative-pressure relief valve helps the safety valves to prevent negative differential pressure.



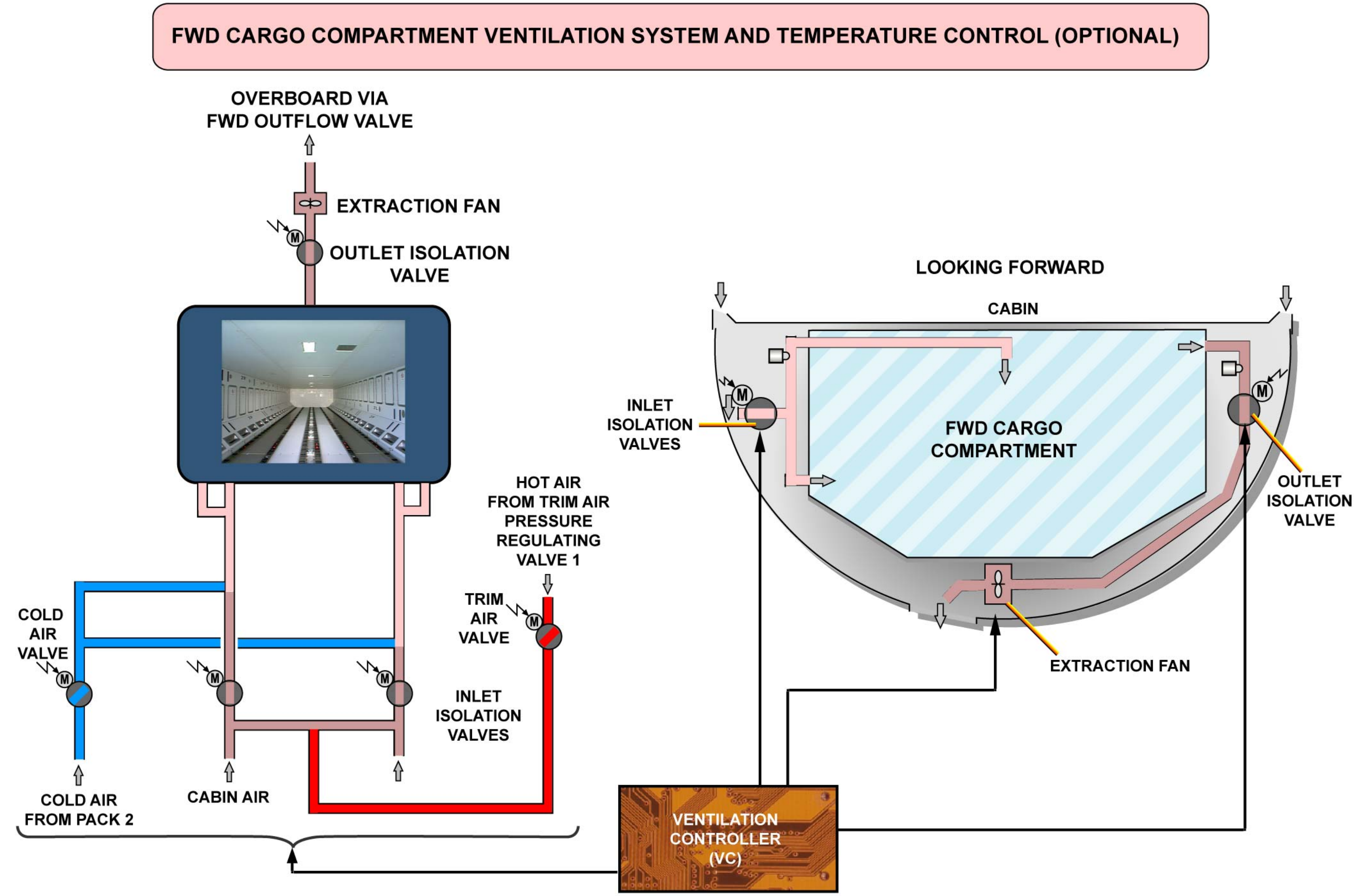
PRESSURIZATION

21 AIR CONDITIONING SYSTEM PRESENTATION (1)

FWD CARGO COMPT VENTILATION SYSTEM AND TEMPERATURE CONTROL (OPTIONAL)

The FWD cargo compartment has ventilation, heating and cooling systems to make the transportation of livestock and perishables possible. The FWD cargo compartment ventilation system is based on an extraction system using cabin air with an extract fan related to isolation valves. The FWD cargo compartment heating is based on hot air coming from the hot air 1 manifold and controlled through a trim air valve. The FWD cargo compartment cooling is based on cold air coming from the Pack 2 and controlled through a cold air valve. The FWD cargo compartment ventilation, heating and cooling systems are controlled and monitored by the VC.

G6B08031 - G10T4T0 - FM21PA000000001



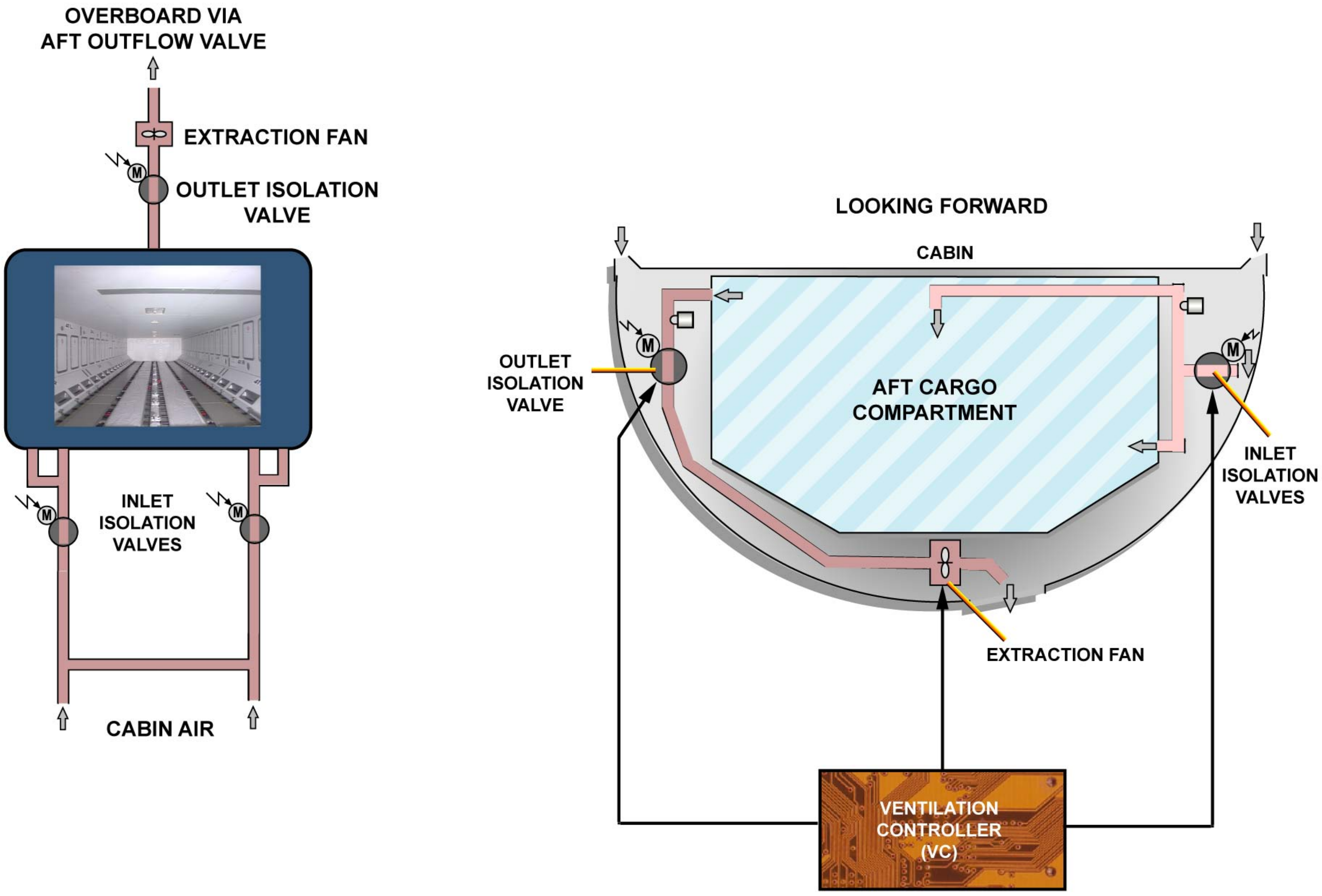
FWD CARGO COMPT VENTILATION SYSTEM AND TEMPERATURE CONTROL (OPTIONAL)

21 AIR CONDITIONING SYSTEM PRESENTATION (1)

AFT CARGO COMPT VENTILATION SYSTEM (OPTIONAL)

The AFT cargo compartment ventilation system is based on an extraction system using cabin air with an extract fan related to isolation valves. The AFT cargo compartment ventilation is controlled and monitored through the VC.

AFT CARGO COMPARTMENT VENTILATION SYSTEM (OPTIONAL)



AFT CARGO COMPT VENTILATION SYSTEM (OPTIONAL)

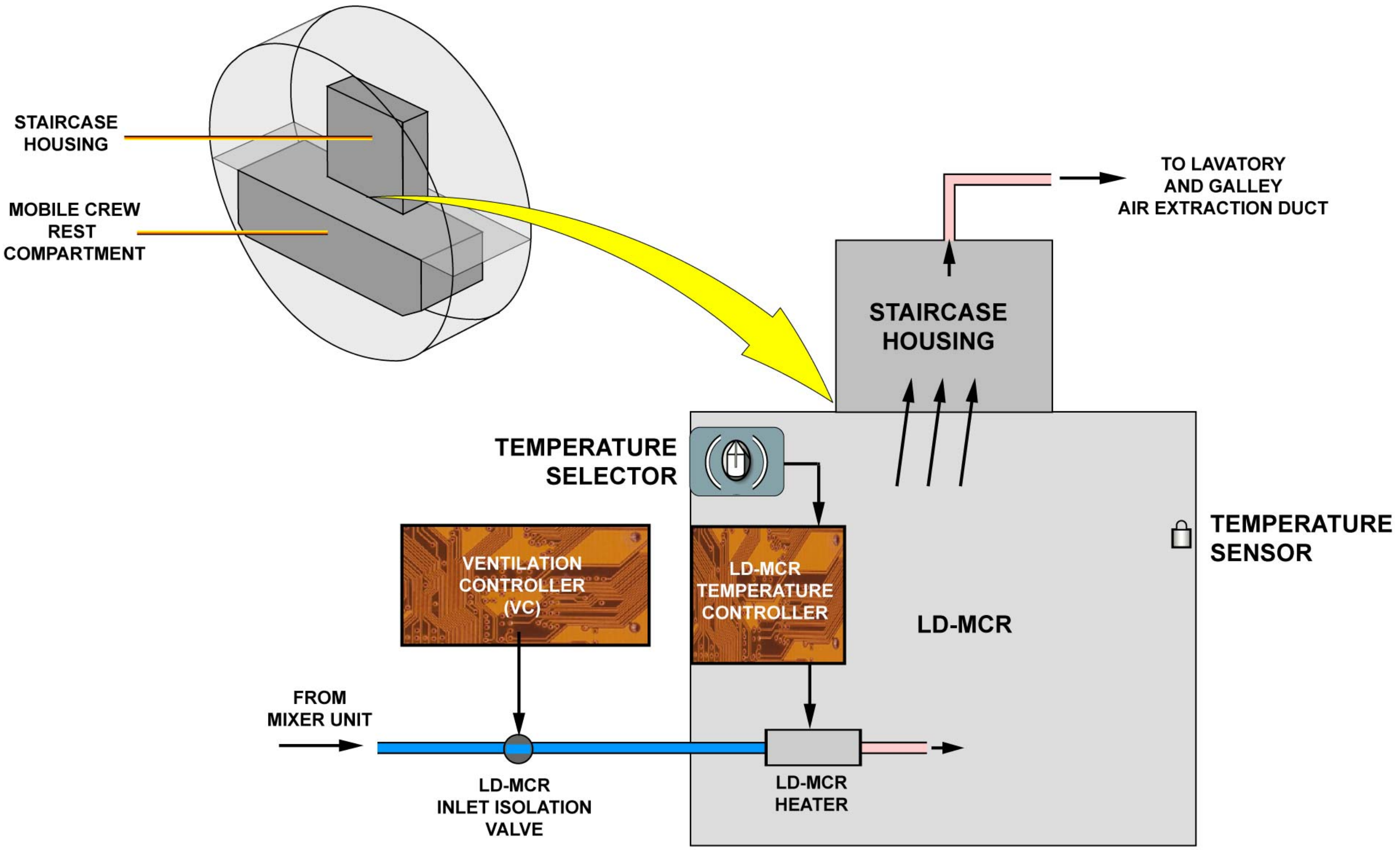
21 AIR CONDITIONING SYSTEM PRESENTATION (1)

CREW REST COMPARTMENT (OPTIONAL)

LD-MCR COMPARTMENT VENTILATION AND HEATING

The Lower Deck Mobile Crew Rest compartment (LD-MCR) gets fresh air from the mixer unit through a dedicated air duct and the LD-MCR isolation valve. This air comes from the air supply duct of cabin areas 5 and 6. The air is then extracted from the LD-MCR through a grid located in the ceiling of the staircase housing, which is connected to the Lavatory and Galley air extraction system. The LD-MCR isolation valve is controlled and monitored by the VC. The isolation valve is automatically closed in case the access hatch is not in the fully open position, or if smoke is detected in the LD-MCR or in the aft/bulk cargo compartment. The LD-MCR has a separate temperature controller and temperature selector that adjust the compartment temperature between 20°C and 25°C by the use of an electrical air-heater. This heating function is not available when the aircraft is on ground.

LOWER DECK MOBILE CREW REST COMPARTMENT VENTILATION AND HEATING



G6B08031 - G10T4T0 - FM21PA000000001

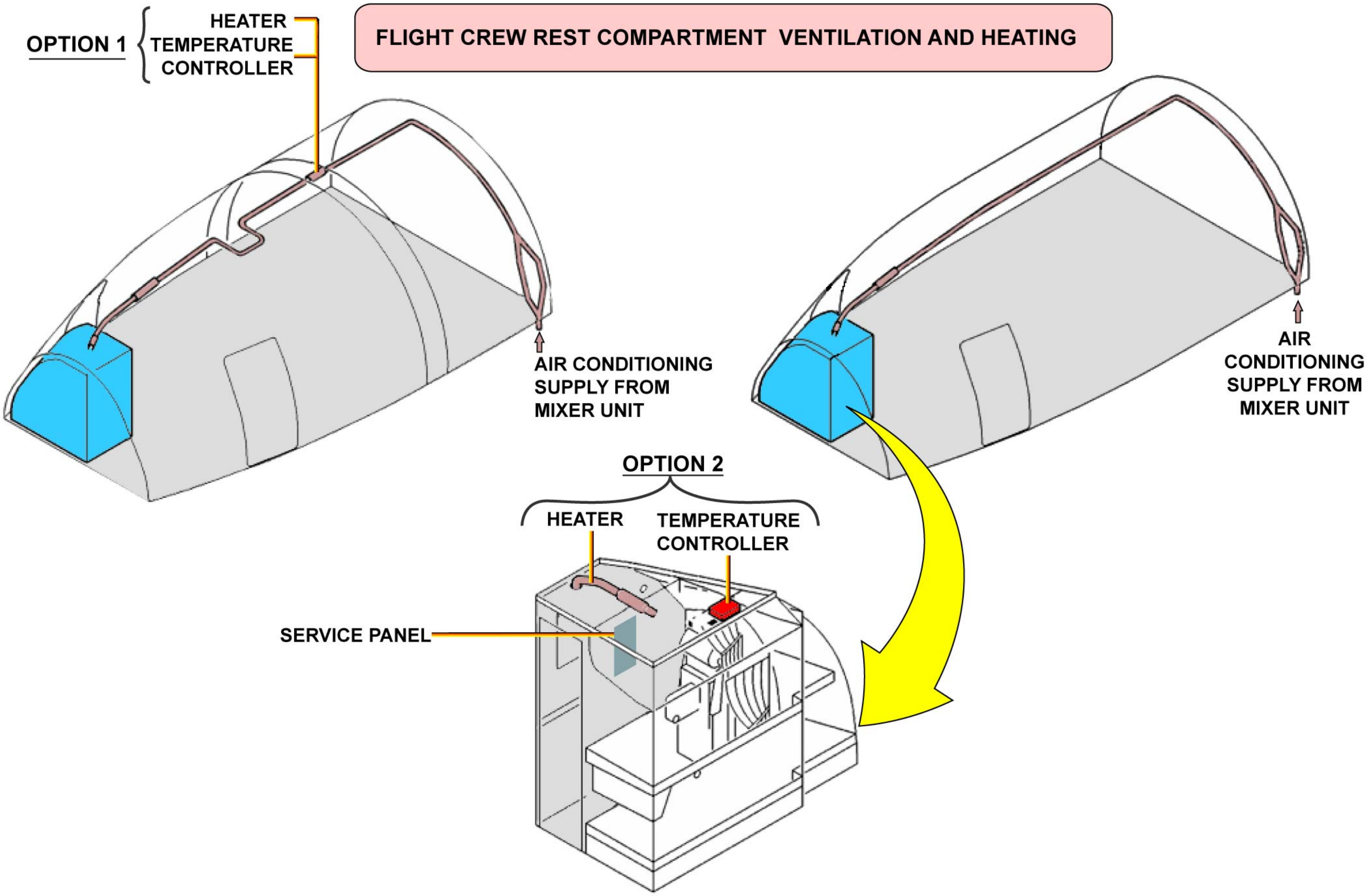
CREW REST COMPARTMENT (OPTIONAL) - LD-MCR COMPARTMENT VENTILATION AND HEATING

21 AIR CONDITIONING SYSTEM PRESENTATION (1)

CREW REST COMPARTMENT (OPTIONAL) (continued)

FLIGHT CREW REST COMPT VENTILATION AND HEATING

Conditioned air coming from the mixer unit ventilates the Flight Crew Rest Compartment (FCRC). The FCRC is also heated by its own heating system. The heating system has an electrical heater, a temperature controller, a temperature sensor and a temperature selector. The temperature sensor and the temperature selector are installed on the service panel.
According to the customer choice, the heater and the temperature controller can be either located between the frame 23 and 24 for the option 1 or just in the ceiling of the FCRC for the option 2.



G6B08031 - G10T4T0 - FM21PA0000000001

CREW REST COMPARTMENT (OPTIONAL) - FLIGHT CREW REST COMPT VENTILATION AND HEATING

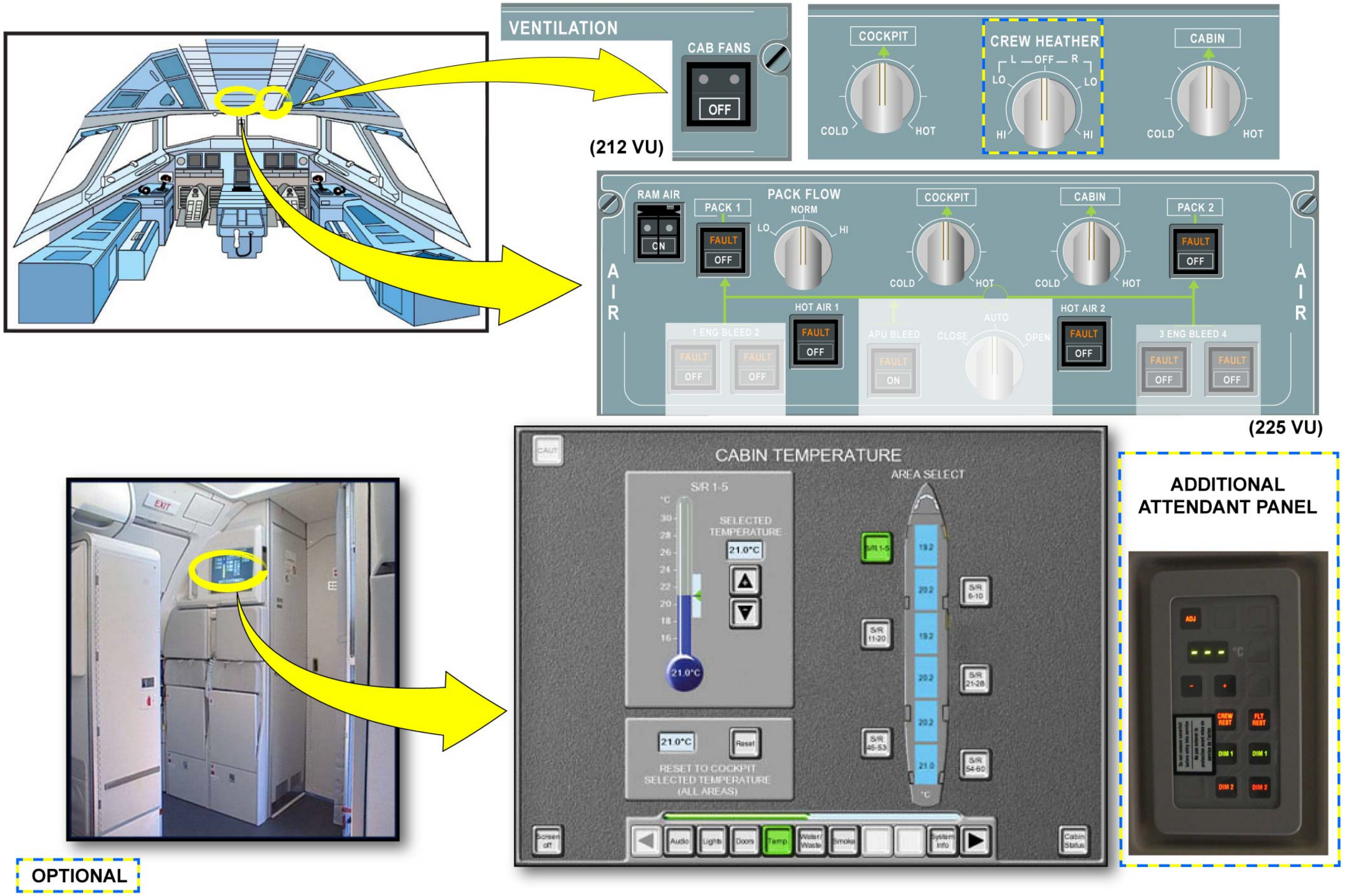
21 AIR CONDITIONING SYSTEM PRESENTATION (1)

CONTROL AND INDICATING

This section will highlight the control panels and indications for the air conditioning system.

TEMPERATURE CONTROL AND RE-CIRCULATION CONTROL PANELS

The pilot uses the AIR COND on the overhead panel to control the air conditioning system. This panel contains the PACK switches, the zone temperature selectors, the PACK FLOW control, the HOT AIR control switches, and the RAM AIR control switch. On the overhead, the VENTILATION panel contains the CAB FANS pushbutton switch. The switch is used to select the re-circulation fans OFF.
At the purser station, the Flight Attendant Panel (FAP) is used to modify the temperature selected in the cockpit by +/- 3 °Celsius for each cabin zone.
In option, and according to customer demand, an additional CREW HEATER temperature selector can be installed on the AIR COND panel. As well as, Additional Attendant Panels (AAPs) can be installed in the passenger cabin.



CONTROL AND INDICATING - TEMPERATURE CONTROL AND RE-CIRCULATION CONTROL PANELS

G6B08031 - G10T4T0 - FM21PA000000001

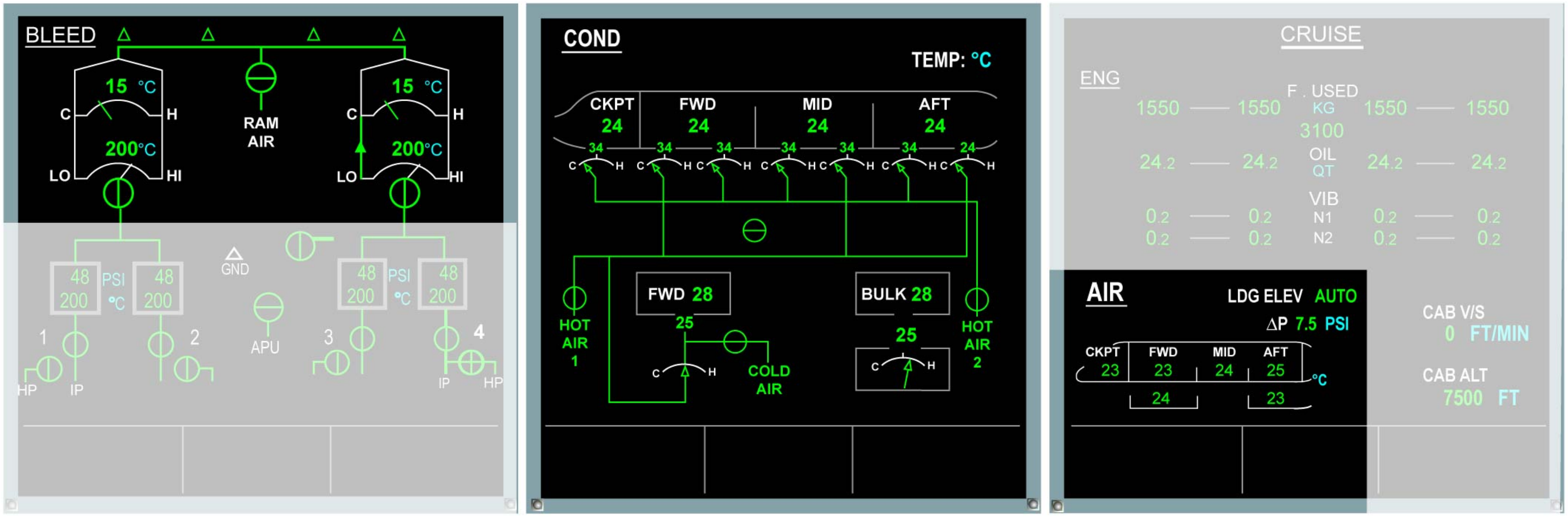
21 AIR CONDITIONING SYSTEM PRESENTATION (1)

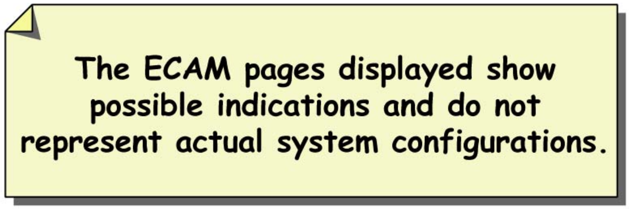
CONTROL AND INDICATING (continued)

TEMPERATURE CONTROL AND RE-CIRCULATION, ECAM PAGES

Basic temperature regulation is accomplished by the Packs. Pack parameters, such as Pack flow and Pack discharge temperature are found on the upper section of the ECAM BLEED page. Fine temperature adjustment is accomplished by trimming hot air from the hot manifolds. Temperature data, hot air valves, hot air shut off valve and trim air shut off valve positions are displayed on the ECAM COND page. Zone temperatures are also displayed on the ECAM CRUISE page.

ECAM PAGES





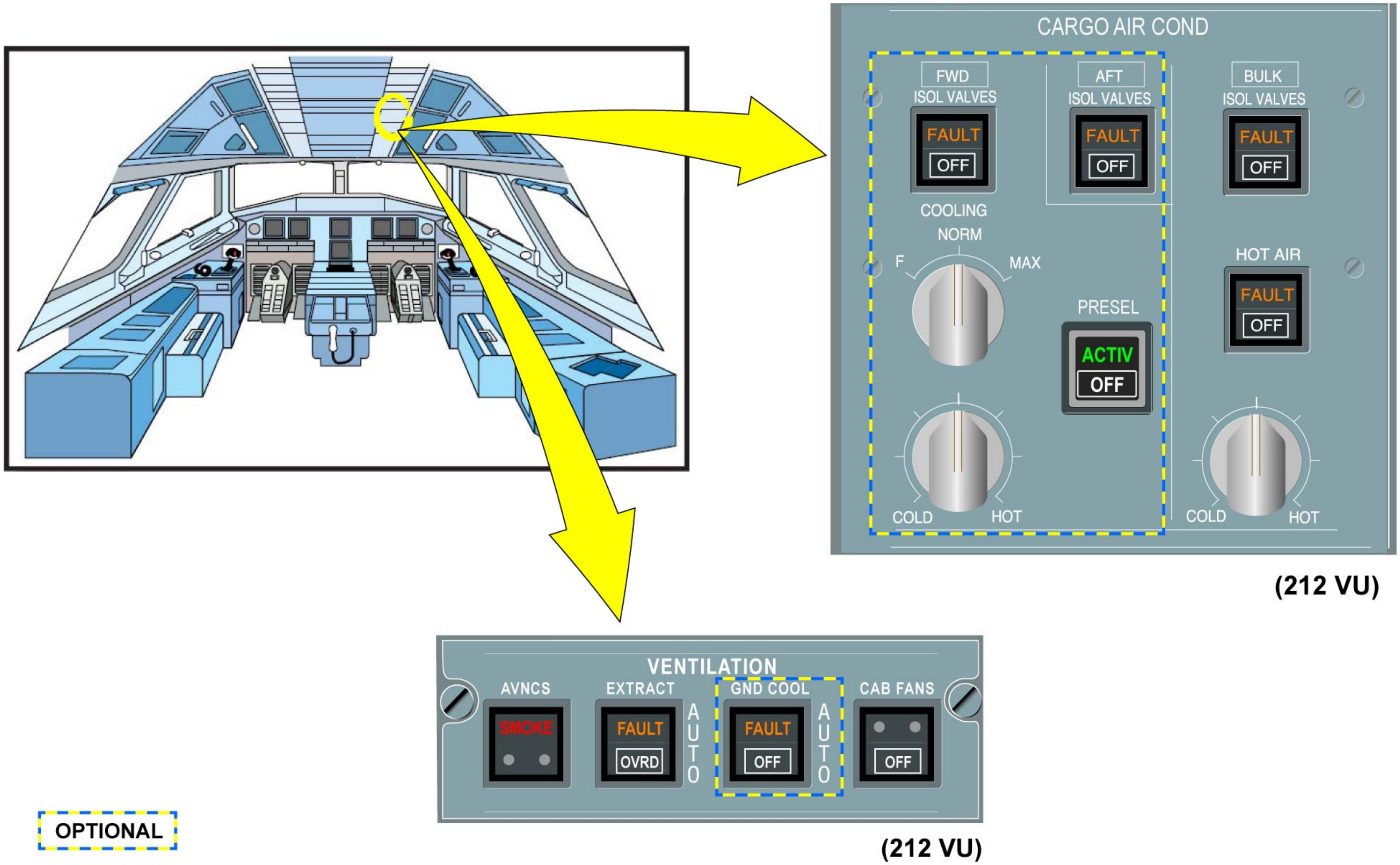
CONTROL AND INDICATING - TEMPERATURE CONTROL AND RE-CIRCULATION, ECAM PAGES

21 AIR CONDITIONING SYSTEM PRESENTATION (1)

CONTROL AND INDICATING (continued)

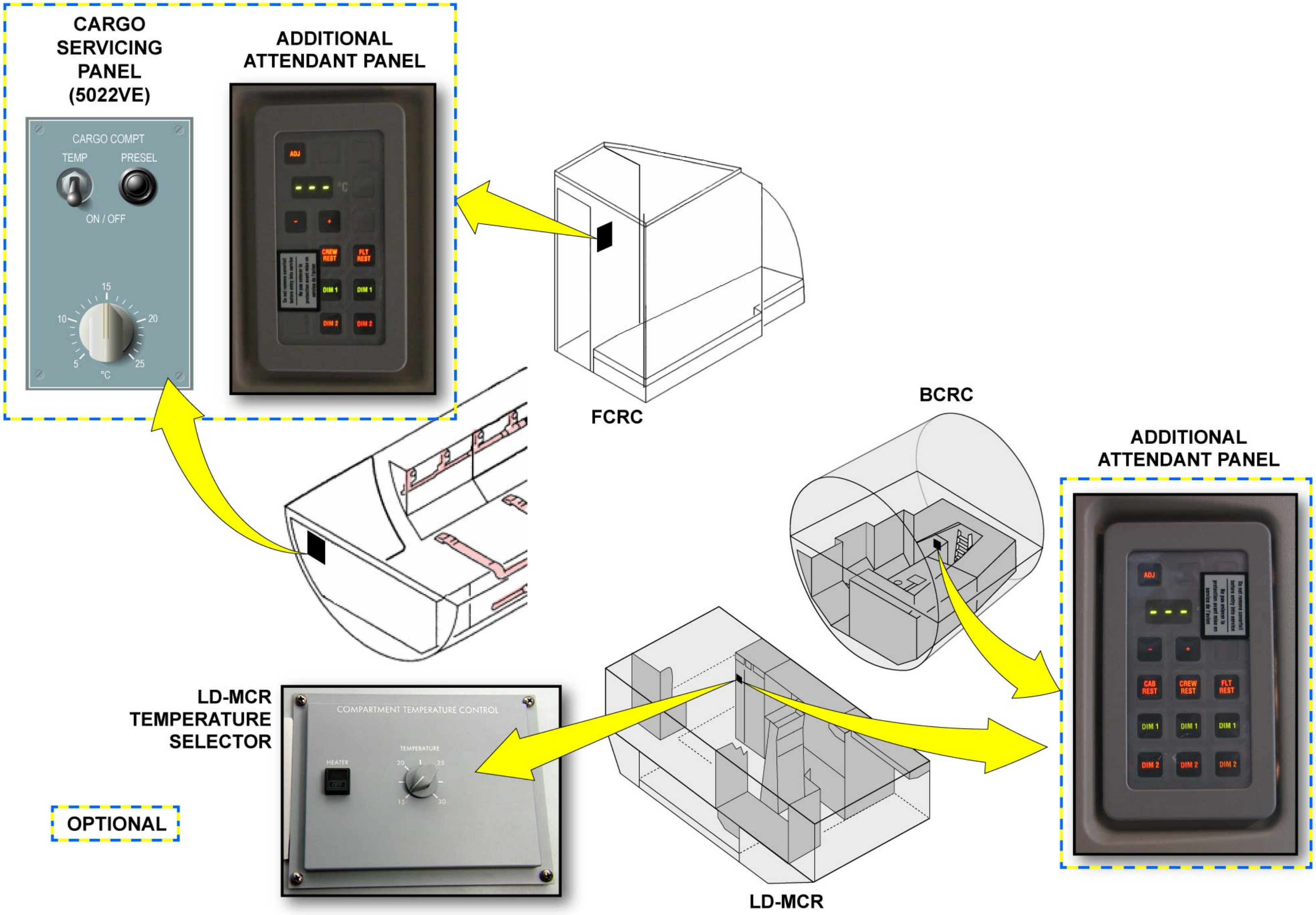
VENTILATION CONTROL PANELS

On the overhead panel, the VENTILATION panel is used to control the avionics equipment ventilation system. This panel contains the EXTRACT switch. When set to AUTO, the avionics ventilation system is fully automatic. In option, and according to customer demand, a Ground (GND) COOL switch on the VENTILATION panel can be added to control the GRU.
On the overhead panel, the CARGO AIR COND panel is used to control the ventilation and heating systems of the bulk cargo compartment. This panel contains the ISOL VALVES switch for the ventilation system, the HEATER switch and the temperature regulation selector for the temperature control system. In option, if the FWD and/or AFT cargo compartments have ventilation, heating and cooling systems, the CARGO AIR COND panel contains the related ISOL VALVES P/BSW, the TEMP selectors, the FWD COOLING selector and the FWD CaRGo PRESELection P/BSW.
In option, Additional Attendant Panel (AAP) with temperature control are linked to the installation of the FCRC, the P-BCR and the MCRC. As well as a temperature control panel can be installed in the FWD or AFT cargo compartments.



G6B08031 - G10T4T0 - FM21PA000000001

CONTROL AND INDICATING - VENTILATION CONTROL PANELS



CONTROL AND INDICATING - VENTILATION CONTROL PANELS

This Page Intentionally Left Blank

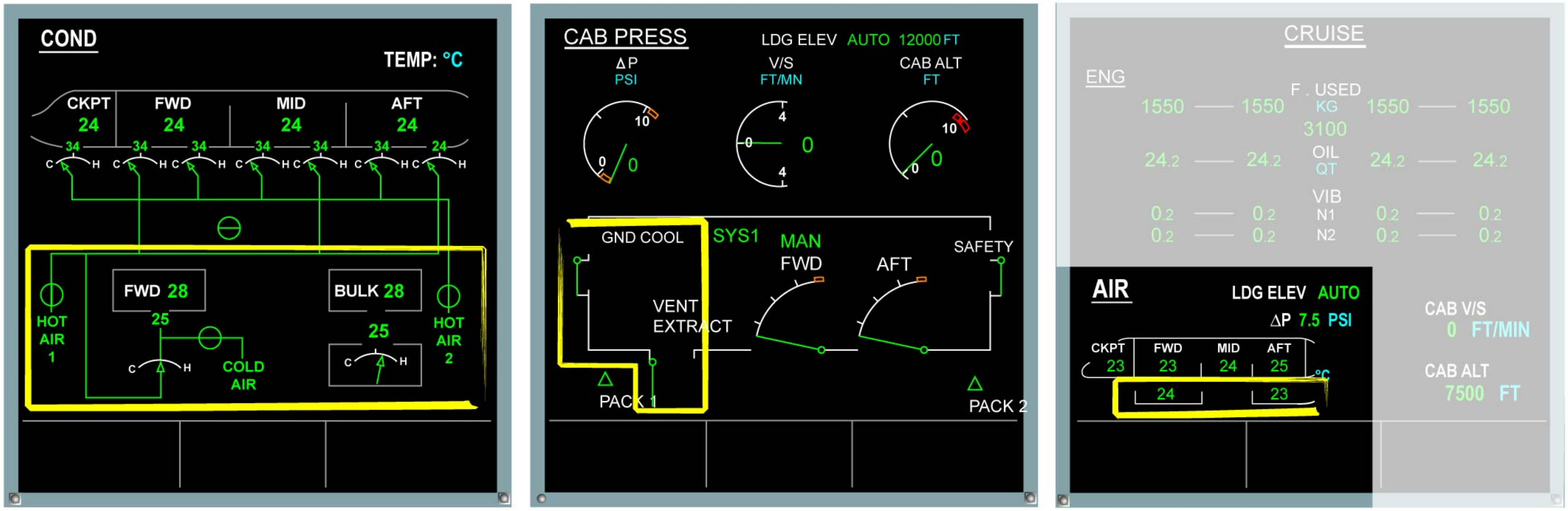
21 AIR CONDITIONING SYSTEM PRESENTATION (1)

CONTROL AND INDICATING (continued)

VENTILATION ECAM PAGES

A section of the ECAM CAB PRESS page displays avionics equipment ventilation system information. The overboard extract valve and the GRU skin valve position are displayed on this page. The indications linked to the FWD, AFT and bulk cargo compartments are displayed on the ECAM COND page. The ambient temperatures in the FWD, AFT and the bulk cargo compartment are also displayed on the ECAM CRUISE page.

ECAM PAGES



The ECAM pages displayed show possible indications and do not represent actual system configurations.

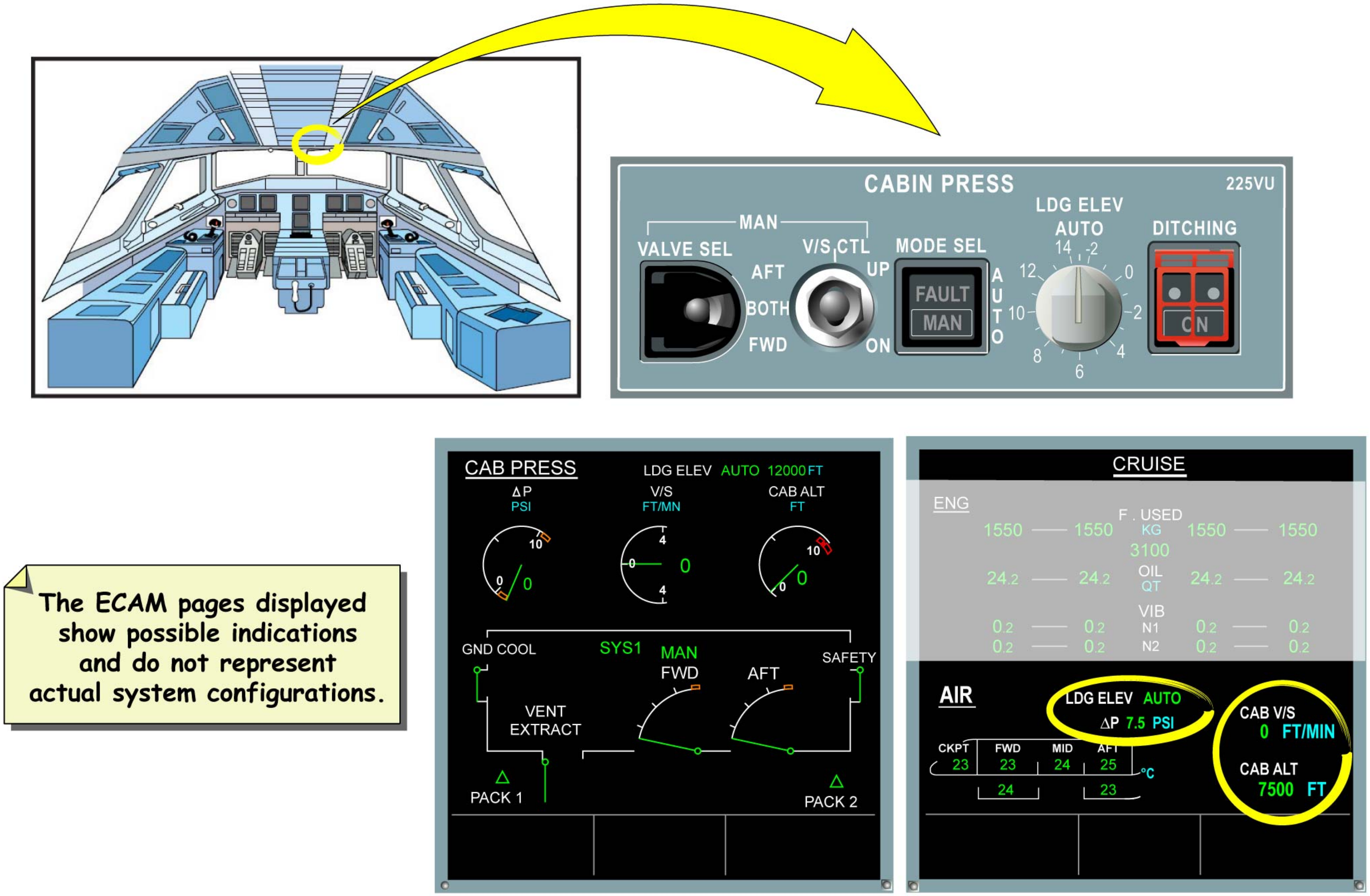
CONTROL AND INDICATING - VENTILATION ECAM PAGES

21 AIR CONDITIONING SYSTEM PRESENTATION (1)

CONTROL AND INDICATING (continued)

PRESSURIZATION CONTROL PANEL AND ECAM PAGES

The CABIN PRESSure control panel is installed on the overhead panel. The panel includes both automatic and manual pressurization controls. The MODE SELect switch lets the system be used in automatic, or in manual mode in case of failure of the automatic function. When the manual mode is selected, the MANual Vertical Speed (V/S) ConTroL switch is used to directly control the outflow valve (indirectly, the cabin rate of climb).
The guarded DITCHING switch is used to close all lower fuselage valves so that the A/C can be sealed in the unlikely event of a ditching.
The crew can monitor all cabin pressure functions on the ECAM CABin PRESSure page. Some of the pressurization parameters are also displayed on the ECAM CRUISE page.



CONTROL AND INDICATING - PRESSURIZATION CONTROL PANEL AND ECAM PAGES

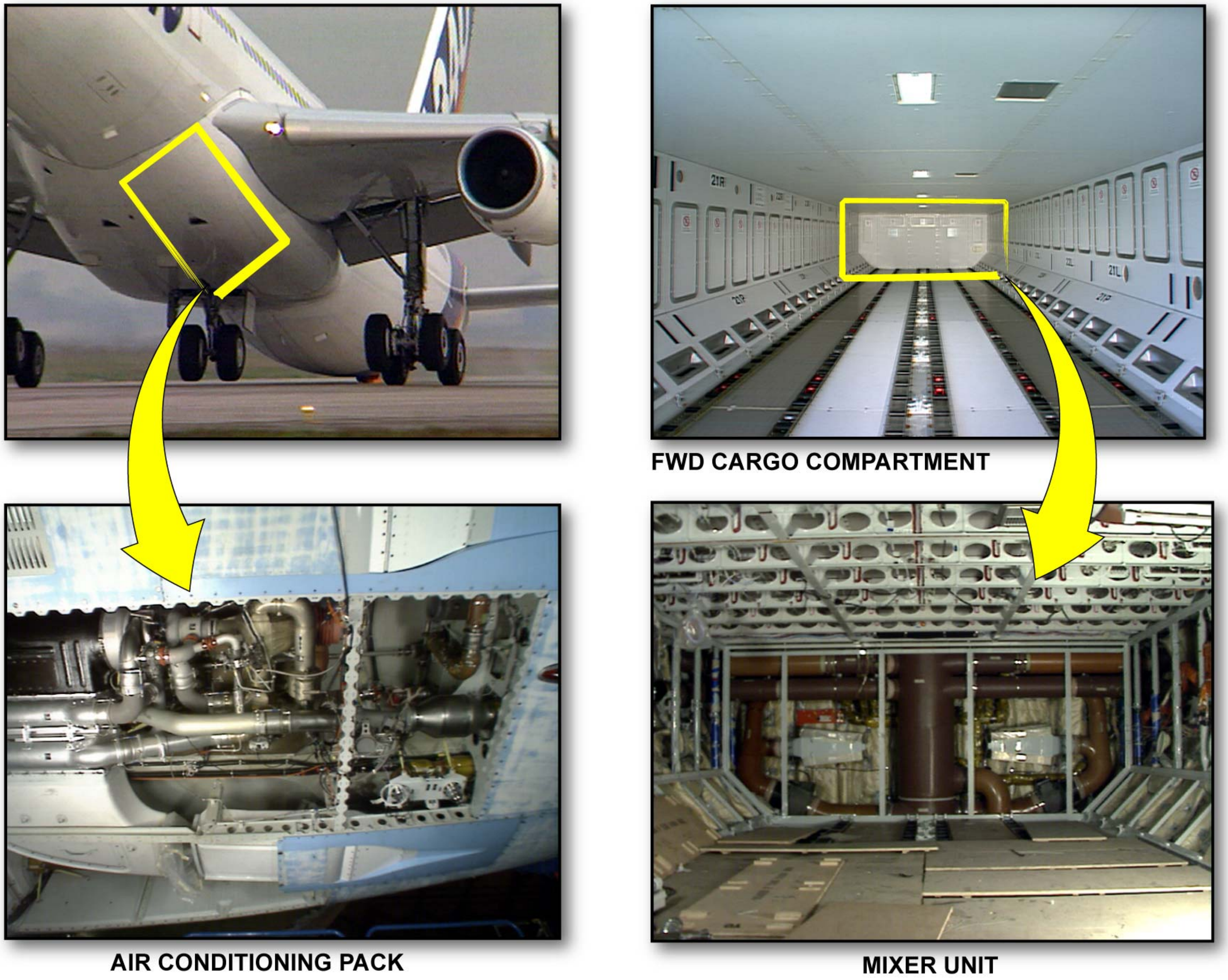
G6B08031 - G10T4T0 - FM21PA000000001

21 AIR CONDITIONING SYSTEM PRESENTATION (1)

COMPONENT LOCATION

TEMPERATURE CONTROL AND RE-CIRCULATION COMPONENT LOCATION

The left and right packs are located in the air conditioning bay. The air conditioning bay is located in the un-pressurized belly fairing forward of the wheel well on the lower fuselage. The belly fairing has inlet for pack and compartment cooling.
The packs supply air to the mixer unit. The mixer unit is installed at the rear of the FWD cargo compartment. It mixes air from the packs and re-circulated air from the cabin prior to distribution to each zone.



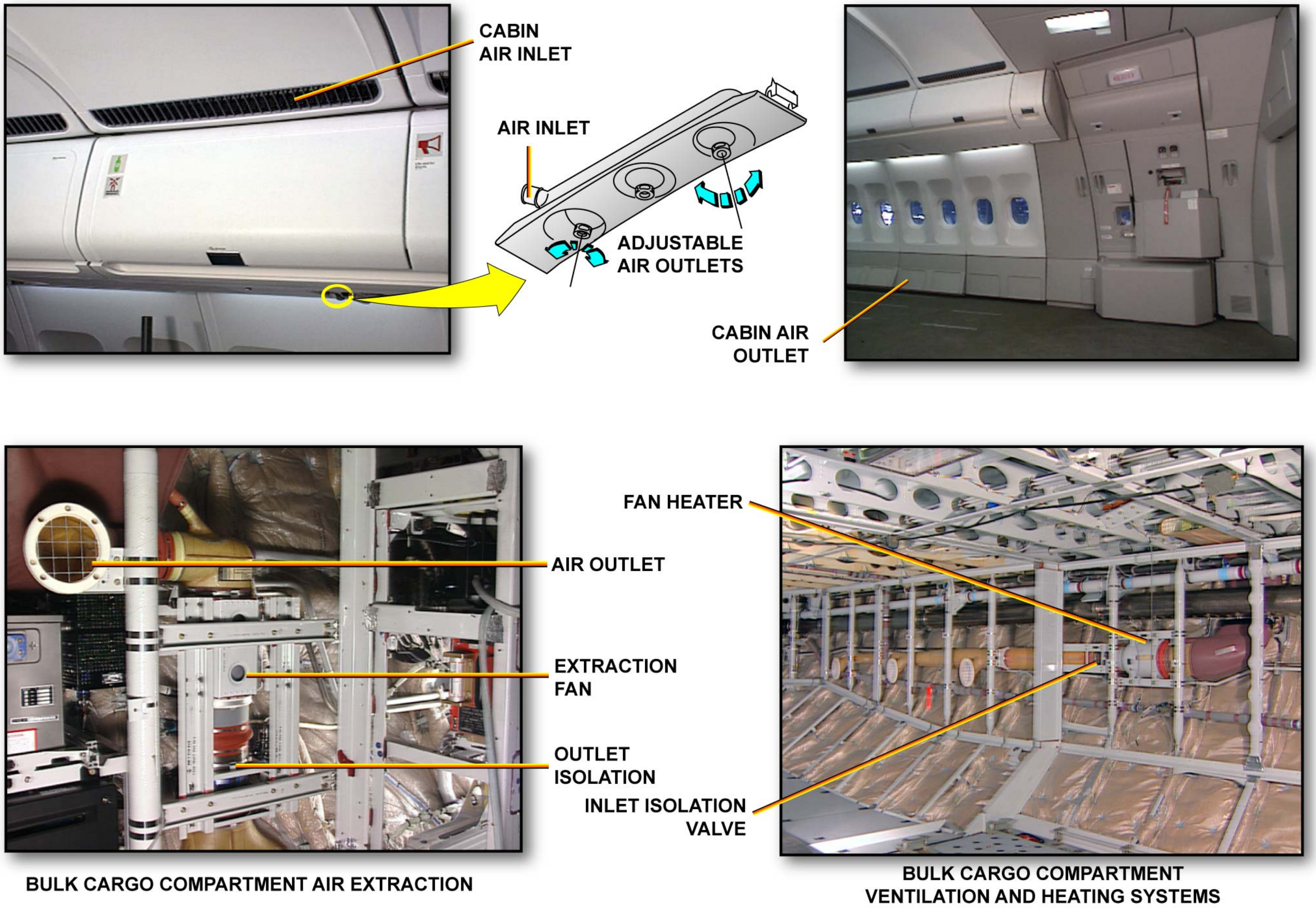
COMPONENT LOCATION - TEMPERATURE CONTROL AND RE-CIRCULATION COMPONENT LOCATION

21 AIR CONDITIONING SYSTEM PRESENTATION (1)

COMPONENT LOCATION (continued)

CABIN AIR DISTRIBUTION AND BULK CARGO COMPT COMPONENT LOCATION

The cabin air is distributed through cabin air outlets located above the hatracks and through individual fresh-air outlet panel.
The cabin air is then distributed in the cargo compartment at DADO panels floor level. The isolation valves, extract fan and fan heater of the bulk cargo compartment ventilation and heating systems are located behind the compartment sidewall panels. Grills protect the air inlets and outlets.



COMPONENT LOCATION - CABIN AIR DISTRIBUTION AND BULK CARGO COMPT COMPONENT LOCATION

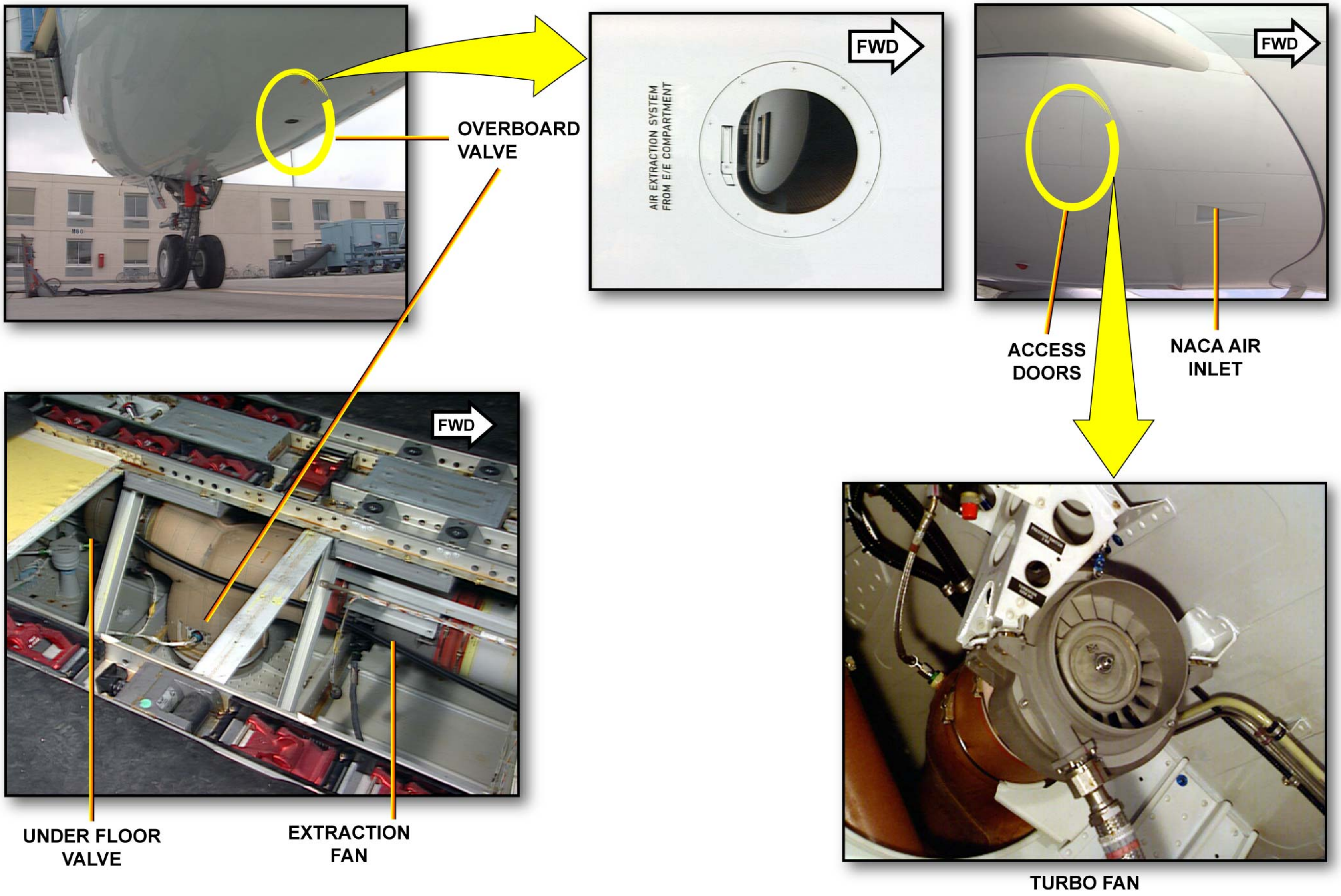
G6B08031 - G10T4T0 - FM21PA000000001

21 AIR CONDITIONING SYSTEM PRESENTATION (1)

COMPONENT LOCATION (continued)

AVIONICS EQUIPMENT VENT AND AIR COND COMPT VENTILATION COMPONENT LOCATION

On ground, the air is extracted from the avionics compartment by the extraction fan and is discharged overboard through the overboard extract valve. In flight, the extraction air is discharged through the underfloor extract valve in the bilge area of the FWD cargo compartment before being discharge overboard through the FWD outflow valve.
The air conditioning compartment ventilation system uses a turbofan on ground and a NACA air inlet in flight.



COMPONENT LOCATION - AVIONICS EQUIPMENT VENT AND AIR COND COMPT VENTILATION COMPONENT LOCATION

21 AIR CONDITIONING SYSTEM PRESENTATION (1)

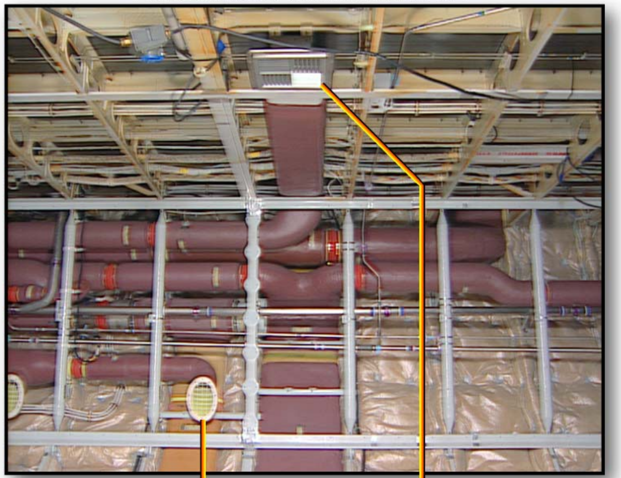
COMPONENT LOCATION (continued)

FWD AND AFT CARGO COMPT COMPONENT LOCATION

The isolation valves and extract fans of the FWD and AFT cargo compartment ventilation systems are located behind the compartment sidewall panels. Grills protect the inlets and outlets.

FWD CARGO COMPARTMENT

FWD CARGO COMPARTMENT



AIR INLET

CEILING AIR INLET

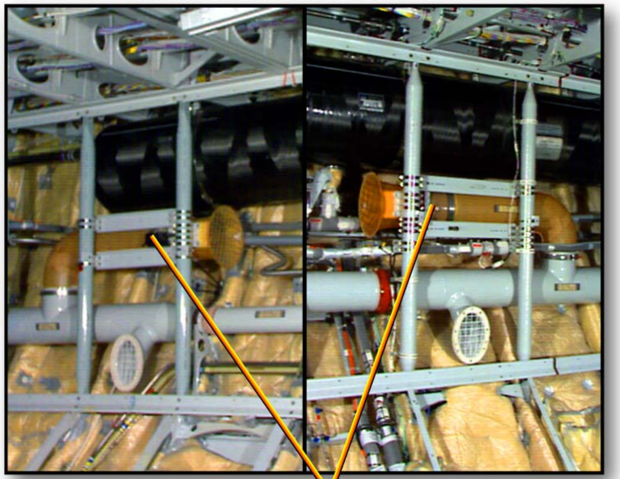
FWD CARGO COMPARTMENT

OUTLET ISOLATION VALVE

EXTRACTION FAN

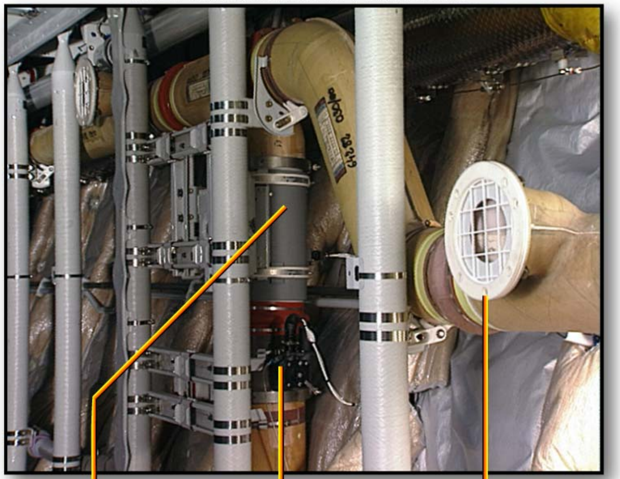
AFT CARGO COMPARTMENT

AFT CARGO COMPARTMENT



INLET ISOLATION VALVES

AFT CARGO COMPARTMENT



EXTRACTION FAN

OUTLET ISOLATION VALVE

AIR OUTLET

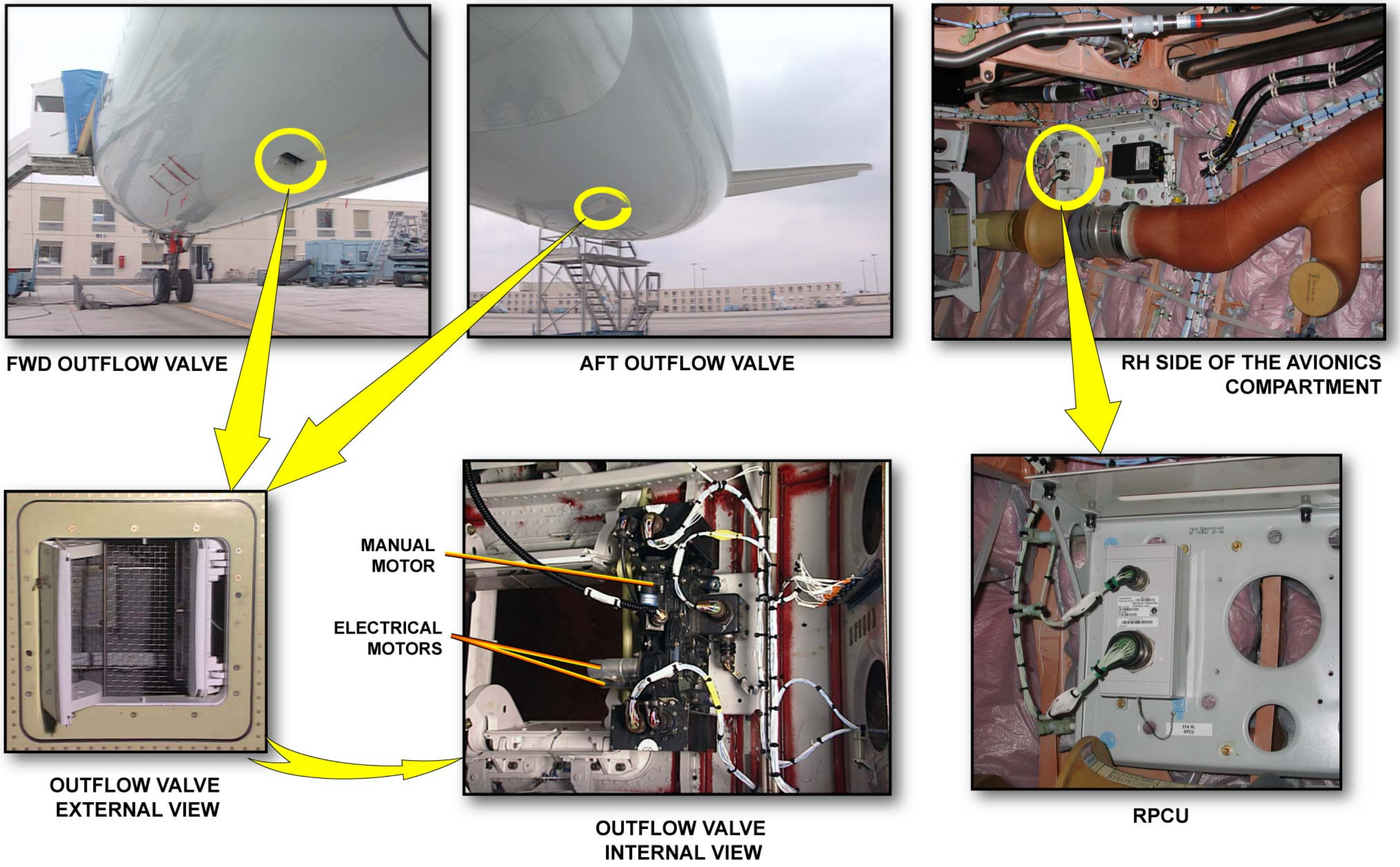
COMPONENT LOCATION - FWD AND AFT CARGO COMPT COMPONENT LOCATION

21 AIR CONDITIONING SYSTEM PRESENTATION (1)

COMPONENT LOCATION (continued)

PRESSURIZATION COMPONENT LOCATION

Pressurization is achieved by the use of a dual gate type outflow valve.
Three electrical motors operate the outflow valves: two for automatic mode and one for manual mode.
The RPCU is installed on the RH side of the avionics compartment.



COMPONENT LOCATION - PRESSURIZATION COMPONENT LOCATION

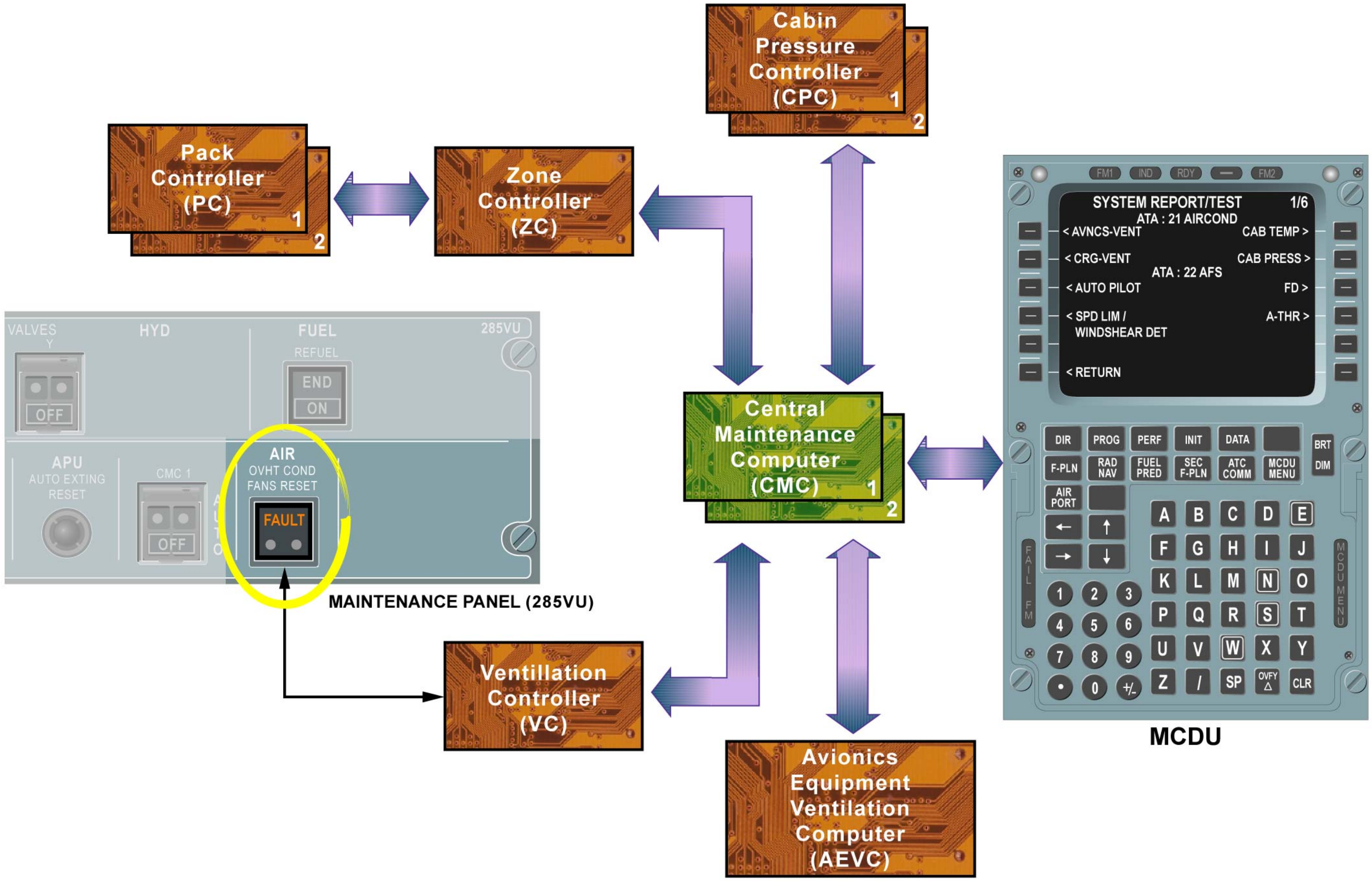
G6B08031 - G10T4T0 - FM21PA000000001

21 AIR CONDITIONING SYSTEM PRESENTATION (1)

MAINTENANCE/TEST FACILITIES

The Central Maintenance Computers (CMCs) will help the maintenance crew to analyze the BITE from the various air conditioning computers by using the Multipurpose Control and Display Unit (MCDUs).
All fans monitored by the VC have a common fan FAULT light due to overheat displayed on the AIR OVHT COND FANS RESET P/BSW on the maintenance panel.

G6B08031 - G10T4T0 - FM21PA000000001

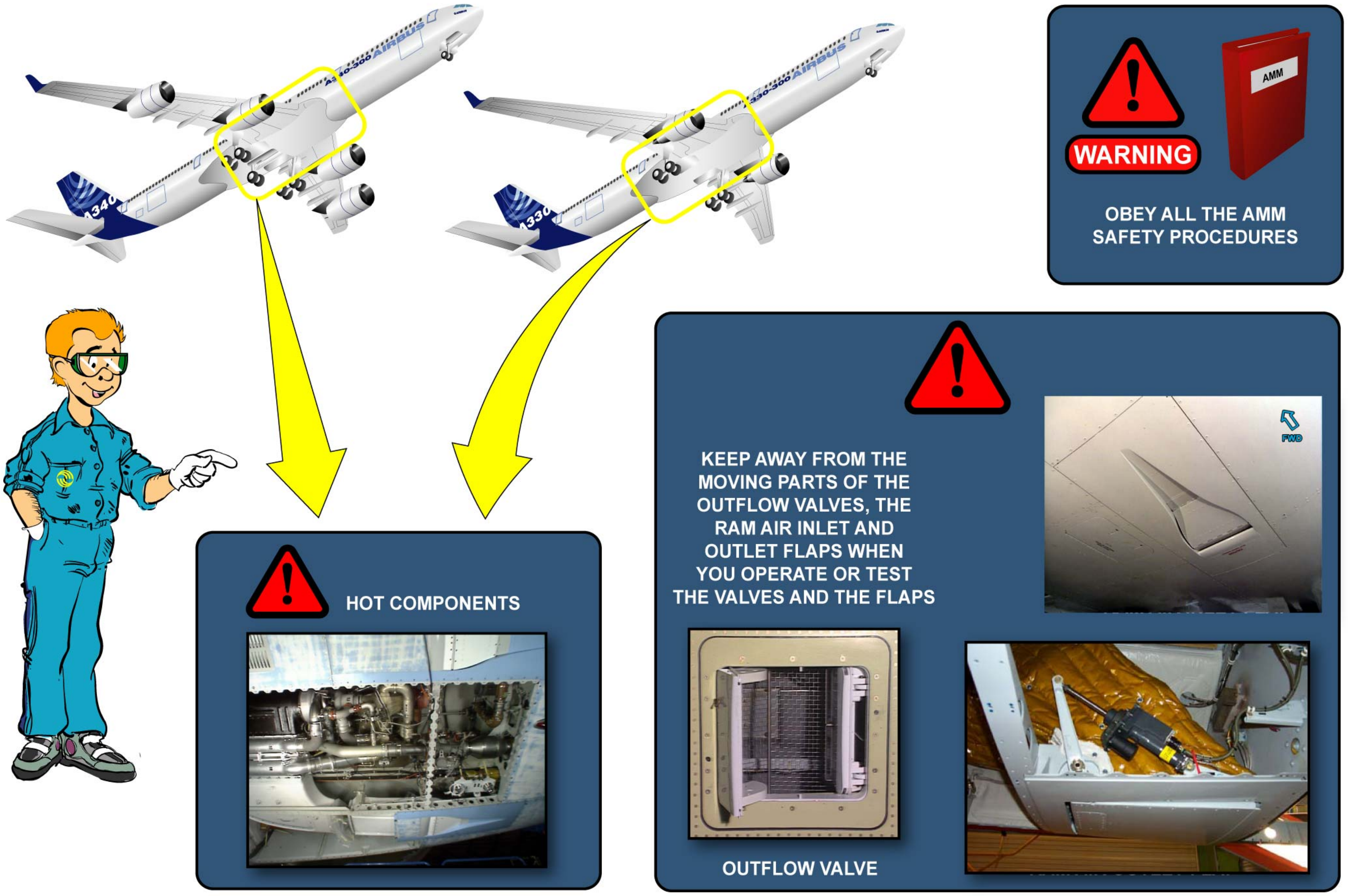


MAINTENANCE/TEST FACILITIES

21 AIR CONDITIONING SYSTEM PRESENTATION (1)

SAFETY PRECAUTIONS

When you work on the air conditioning system, make sure that you obey all the Aircraft Maintenance Manual (AMM) safety procedures. This will prevent injury to persons and/or damage to the aircraft. Here is an overview of the main safety procedures relative to the air conditioning system.
Do not touch A/C components until they are sufficiently cool to prevent burns.
Keep away from the moving parts of the outflow valves, and the ram air inlet and outlet flaps when you operate or test the valves and the flaps to avoid injury to persons.



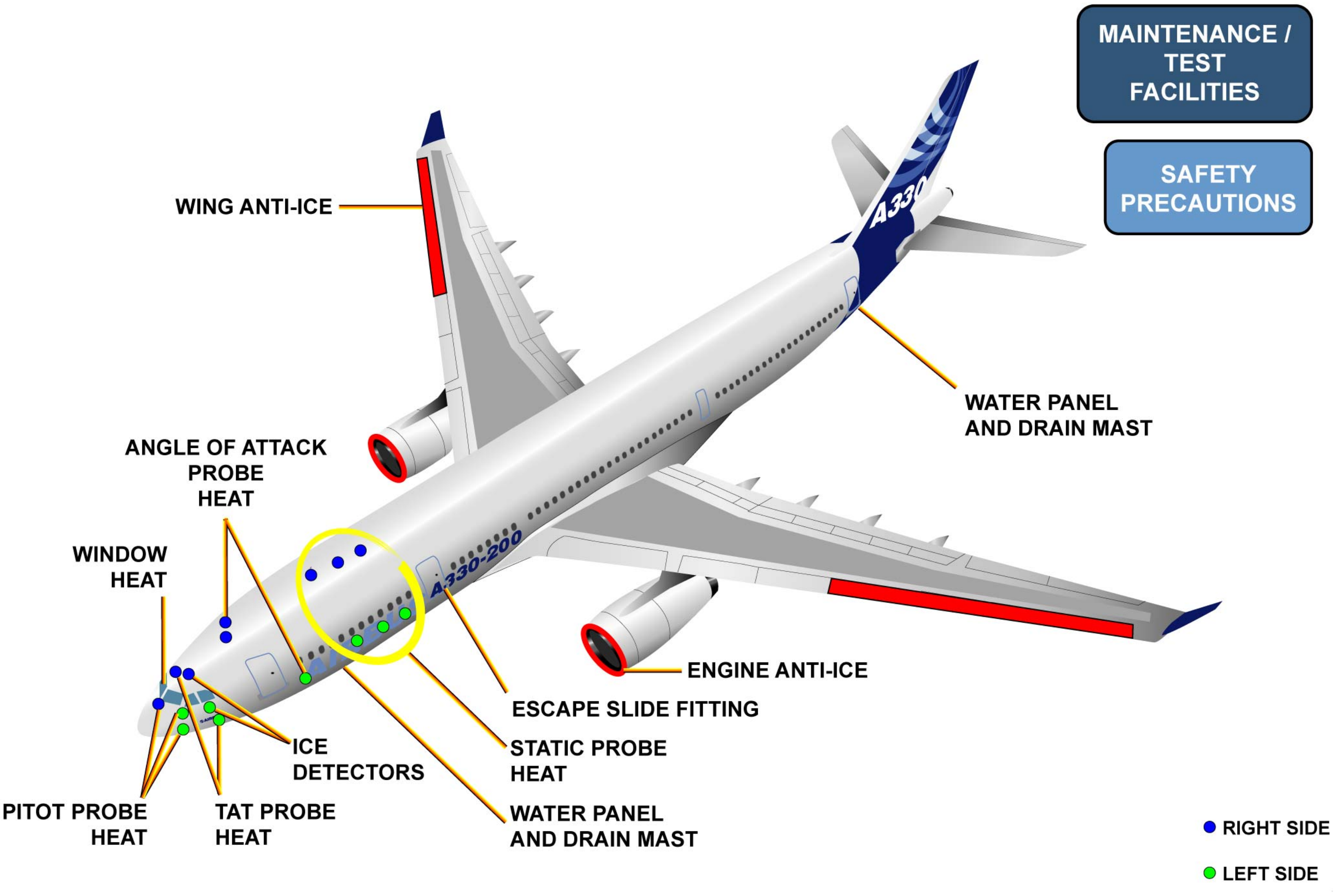
SAFETY PRECAUTIONS

30 ICE & RAIN PROTECTION SYS PRES. (RR700) (1)

GENERAL

The Ice and Rain Protection System lets the aircraft operate without restriction in icing conditions or heavy rain. Hot air or electrical heating protects critical areas of the aircraft. The different sub systems of the Ice and Rain Protection System are:
- wing ice protection,
- engine air intake ice protection,
- probe ice protection,
- windshield anti-icing, defogging and rain protection,
- potable and waste water ice protection,
- escape slide locking mechanism ice protection,
- ice detection,
- maintenance/test facilities.

When you work on aircraft, you must obey all the safety procedures listed in the AMM.



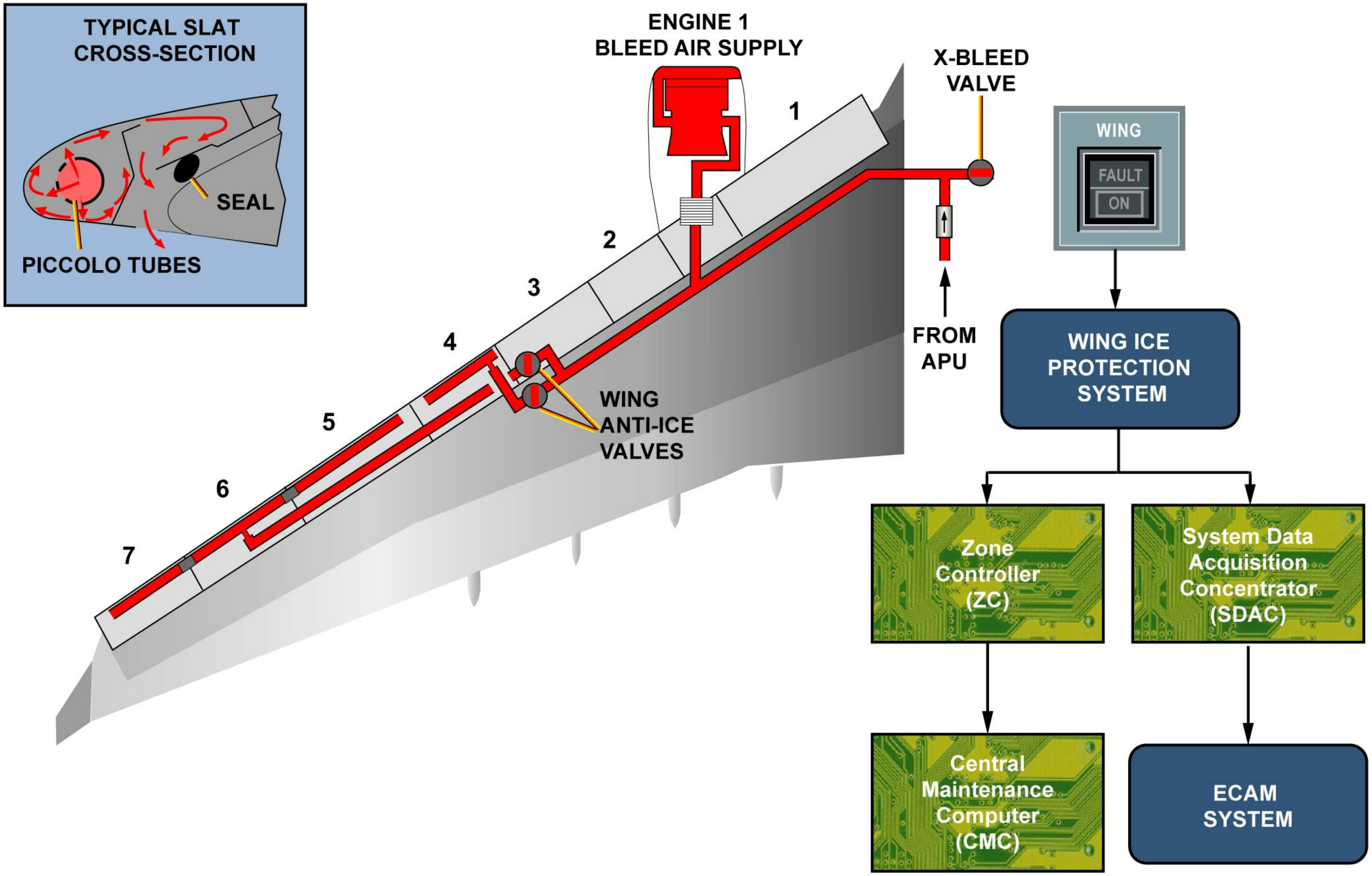
GENERAL

G6B08031 - G10T4T0 - FM30P9000000003

30 ICE & RAIN PROTECTION SYS PRES. (RR700) (1)

WING ICE PROTECTION

During icing conditions, hot air is supplied by the pneumatic system to the four outboard slats to raise the temperature. Bleed air is supplied to each wing through two Wing Anti Ice (WAI) valves, one for the slat number four and one for slats number five, six and seven.
If a failure occurs in the wing ice protection system:
- the Zone Controller (ZC) sends the failure data to the Central Maintenance Computer (CMC),
- the System Data Acquisition Concentrator (SDAC) sends data to the ECAM.



WING ICE PROTECTION

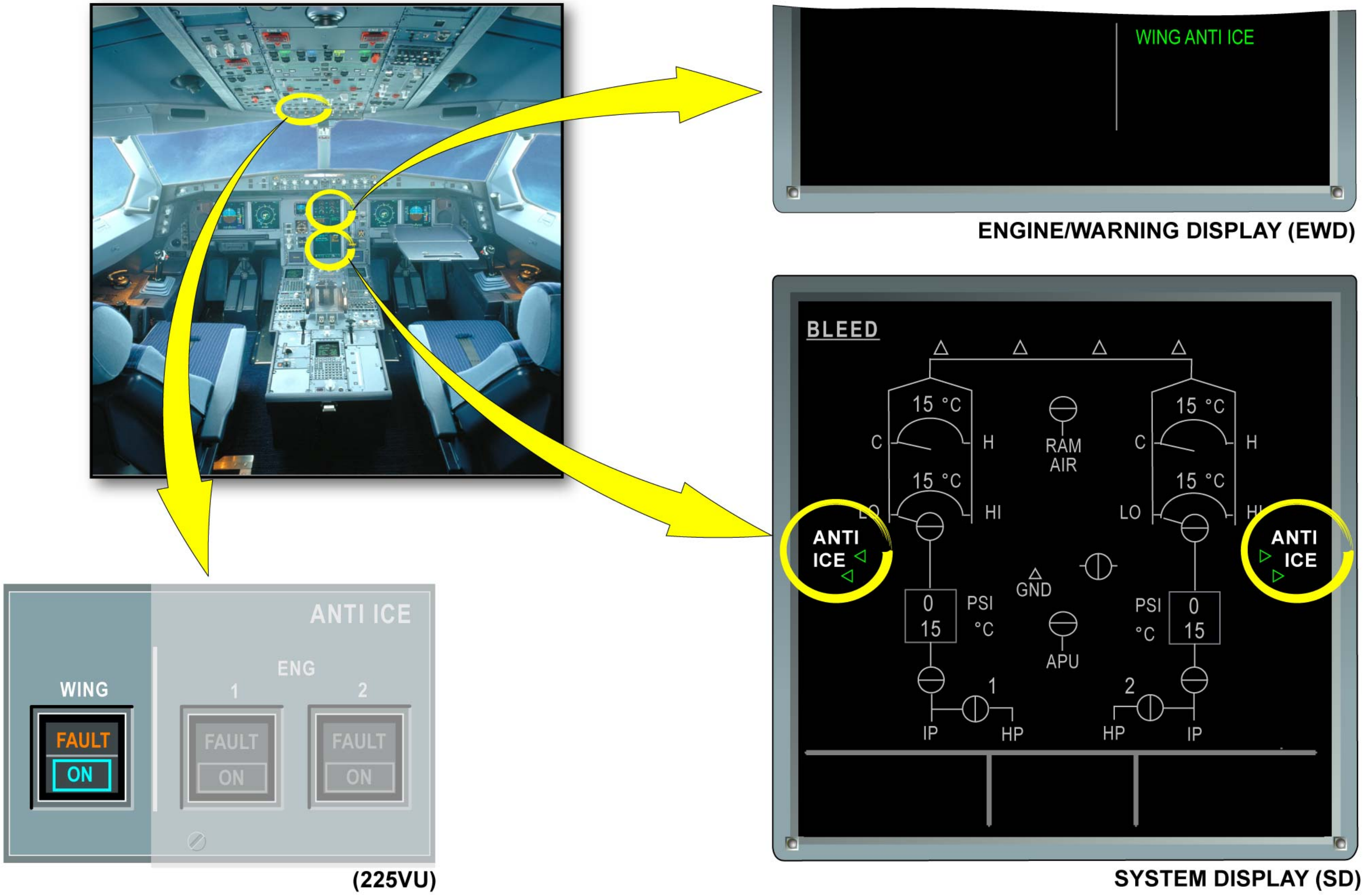
30 ICE & RAIN PROTECTION SYS PRES. (RR700) (1)

WING ICE PROTECTION (continued)

CONTROL AND INDICATING

The control for he WAI system is located on the overhead ANTI ICE panel. A MEMO appears on the EWD when the WAI is selected. WAI valve position indication is available on the BLEED page when the system is selected.

G6B08031 - G10T4T0 - FM30P9000000003



WING ICE PROTECTION - CONTROL AND INDICATING

G6B08031 - G10T4T0 - FM30P9000000003

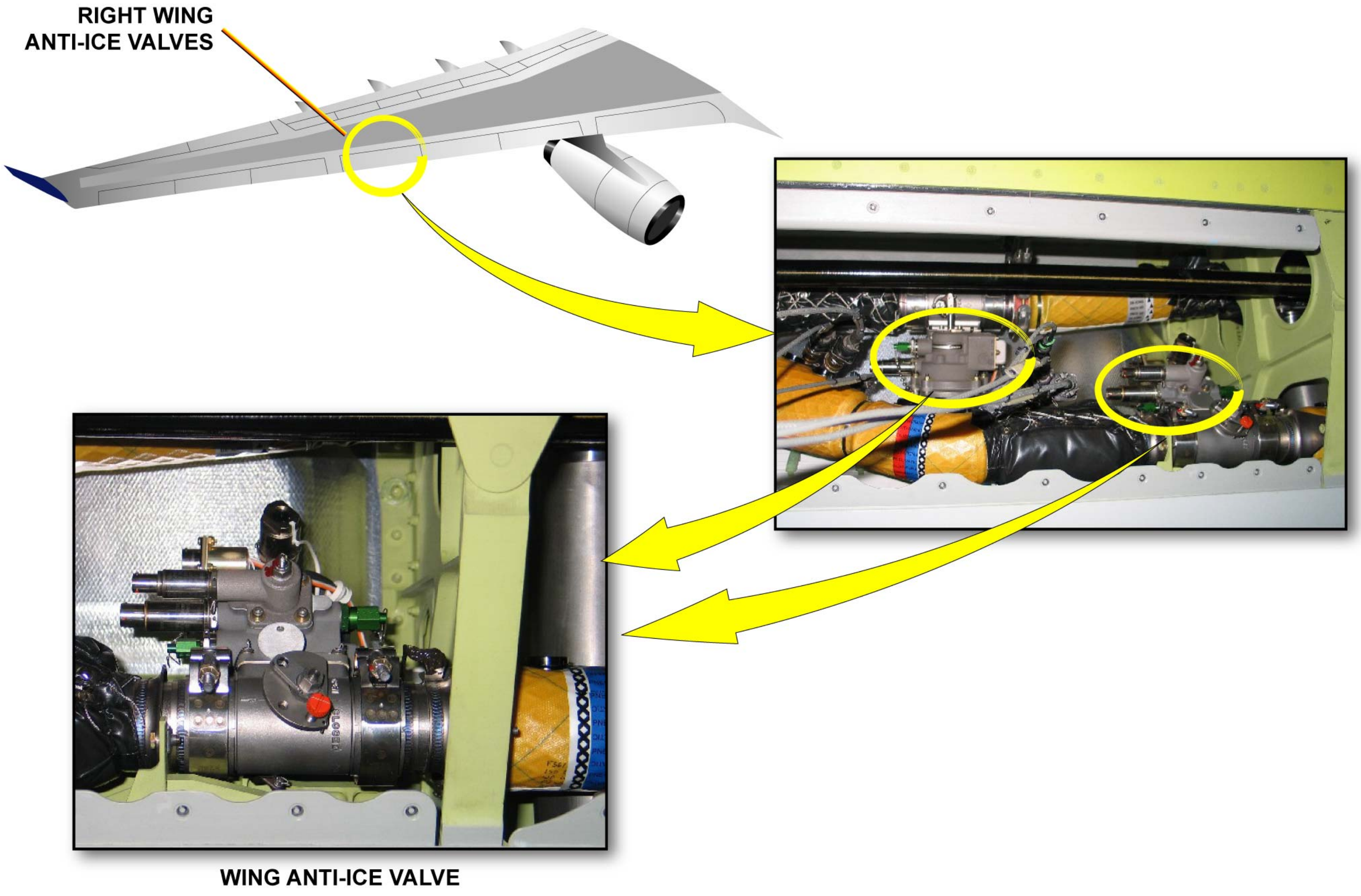
30 ICE & RAIN PROTECTION SYS PRES. (RR700) (1)

WING ICE PROTECTION (continued)

COMPONENT LOCATION

The inner and outer wing anti-ice valves are installed on the stable leading edges of the wings.

G6B08031 - G10T4T0 - FM30P9000000003



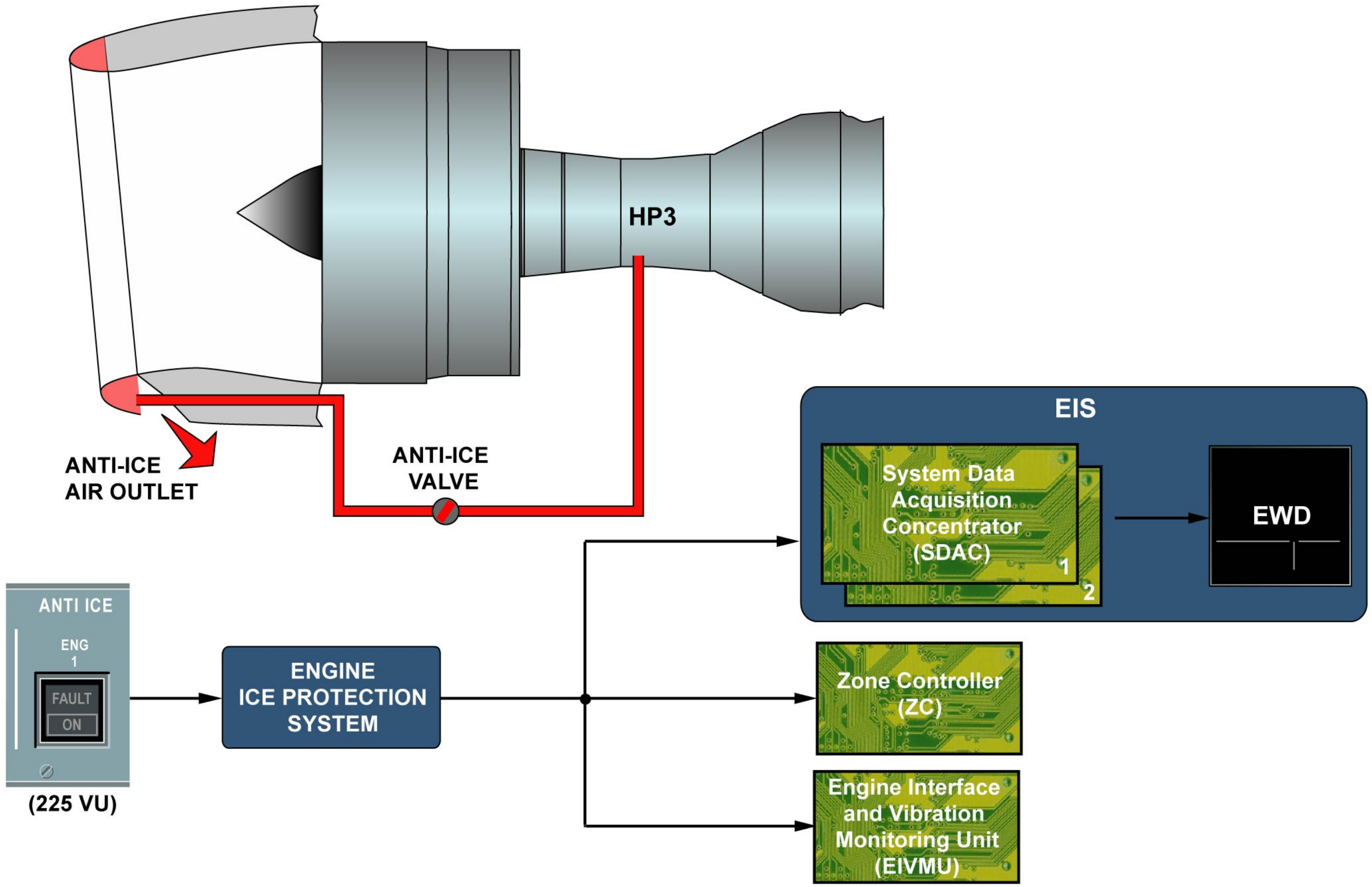
WING ICE PROTECTION - COMPONENT LOCATION

G6B08031 - G10T4T0 - FM30P9000000003

30 ICE & RAIN PROTECTION SYS PRES. (RR700) (1)

ENGINE AIR INTAKE ICE PROTECTION

Engine air intake ice protection system ensures safe engine operation in icing or snowy conditions. Hot air bled from HP compressor is used to heat the engine air intake lip in order to prevent ice accretion. Hot air is supplied through an engine air intake anti-ice valve.
The engine air intake ice protection system interfaces with the SDAC for system status display on the ECAM and warning generation. The engine air intake ice protection system also interfaces with the ZC for air bleed demand computation to be sent to the Full Authority Digital Engine Control (FADEC) via the Engine Interface and Vibration Monitoring Unit (EIVMU).



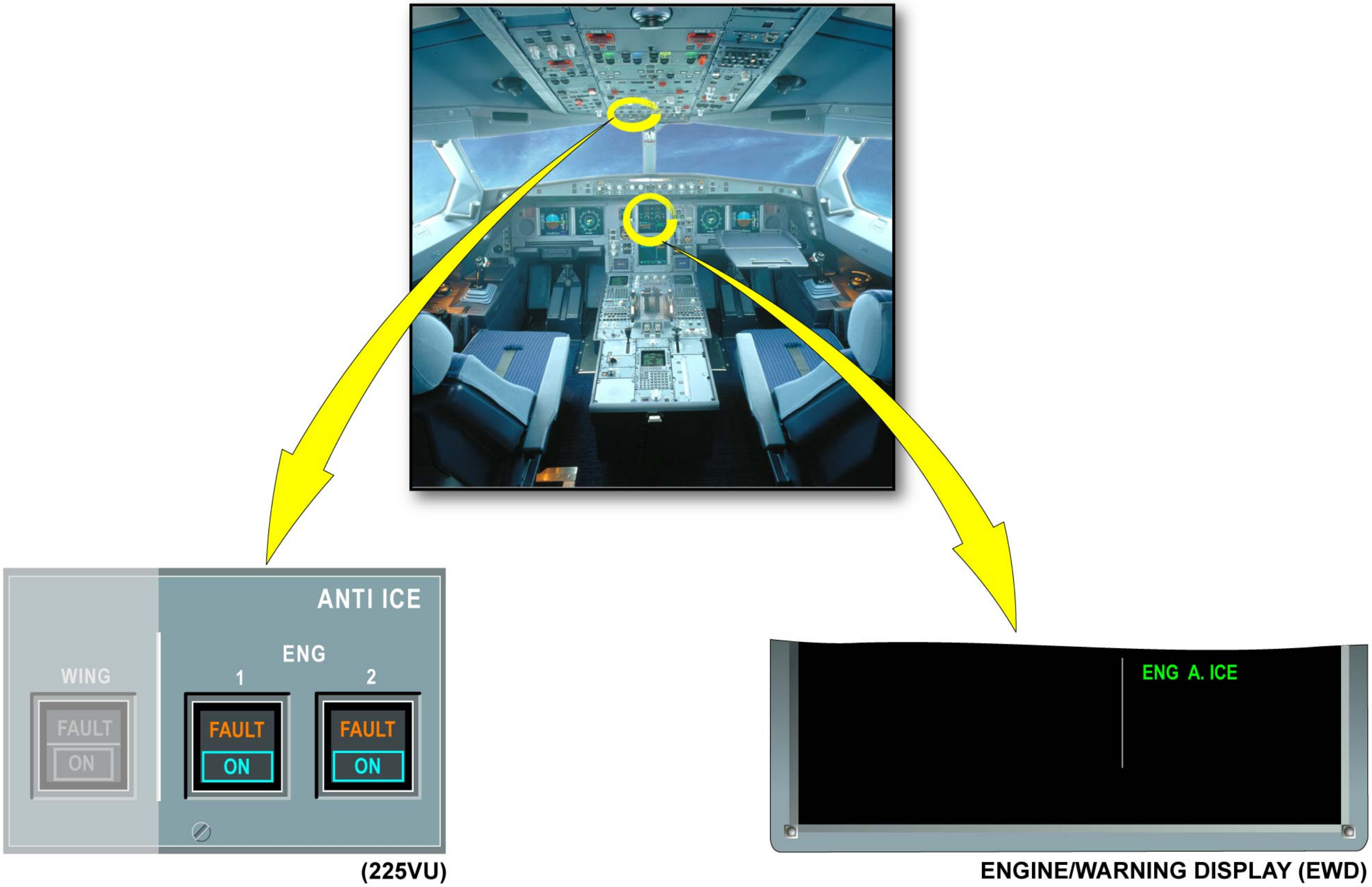
ENGINE AIR INTAKE ICE PROTECTION

30 ICE & RAIN PROTECTION SYS PRES. (RR700) (1)

ENGINE AIR INTAKE ICE PROTECTION (continued)

CONTROL AND INDICATING

The controls for the engine anti-ice system are located on the overhead panel. Each engine anti-ice valve is controlled manually by a dedicated P/BSW on the ANTI ICE panel. A MEMO appears on the EWD when the engine anti-ice is selected. In case of abnormal operation, the FAULT light comes on, on the related P/BSW.



ENGINE AIR INTAKE ICE PROTECTION - CONTROL AND INDICATING

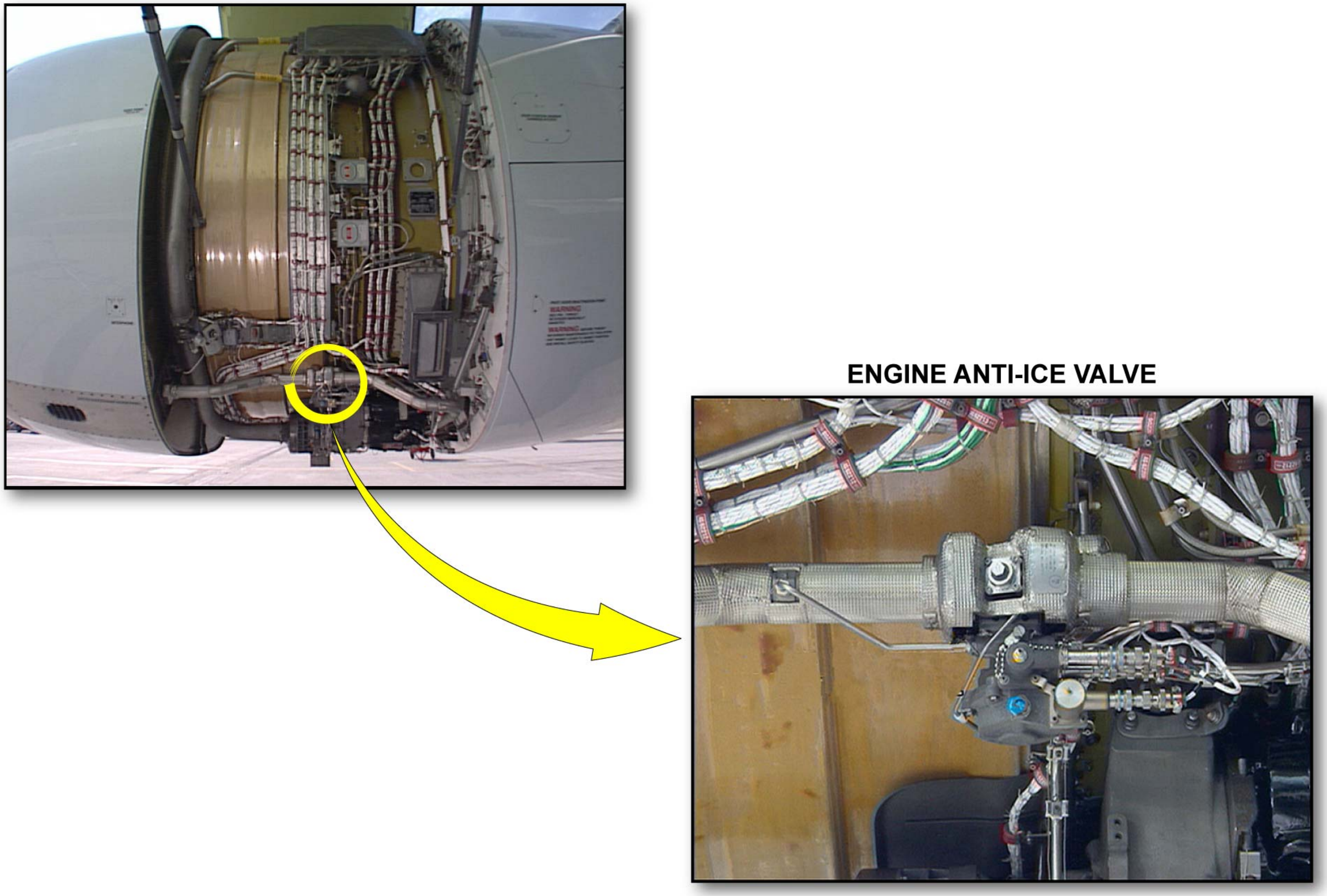
30 ICE & RAIN PROTECTION SYS PRES. (RR700) (1)

ENGINE AIR INTAKE ICE PROTECTION (continued)

COMPONENT LOCATION

The engine anti-ice valve is installed on the lower left hand side of the engine.

G6B08031 - G10T4T0 - FM30P9000000003



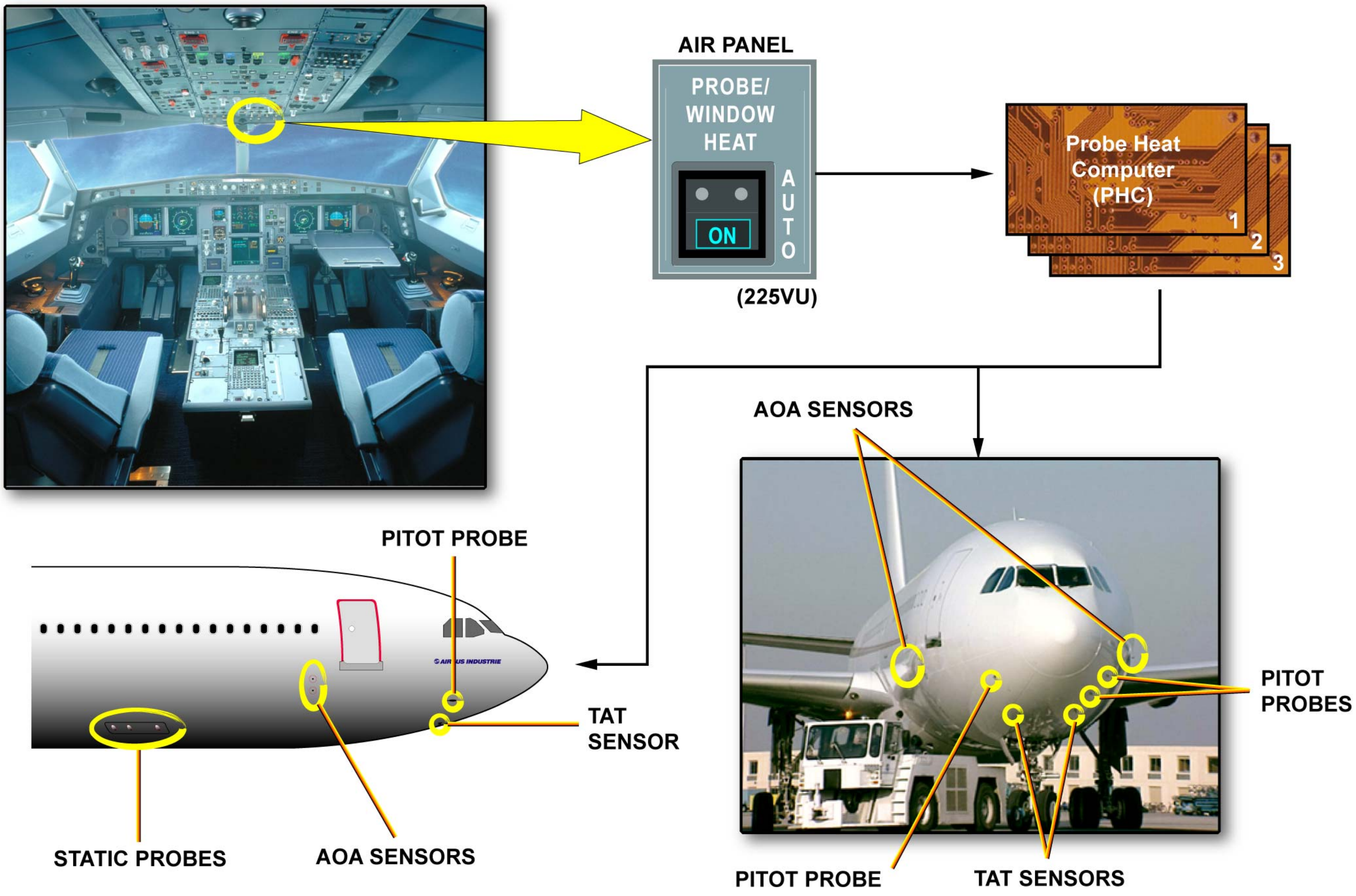
ENGINE AIR INTAKE ICE PROTECTION - COMPONENT LOCATION

G6B08031 - G10T4T0 - FM30P9000000003

30 ICE & RAIN PROTECTION SYS PRES. (RR700) (1)

PROBE ICE PROTECTION

The static ports, Angle Of Attack (AOA), pitot and Total Air Temperature (TAT) probes are electrically heated to prevent ice formation. The Captain, the First Officer and standby probe heating systems are independent. Each one has one Probe Heat Computer (PHC), which controls probe and static port heating. The standby system has no TAT probe. The PROBE/WINDOW HEAT P/BSW overrides the automatic operation. On ground, pitot heating is reduced and TAT heating is cut off.



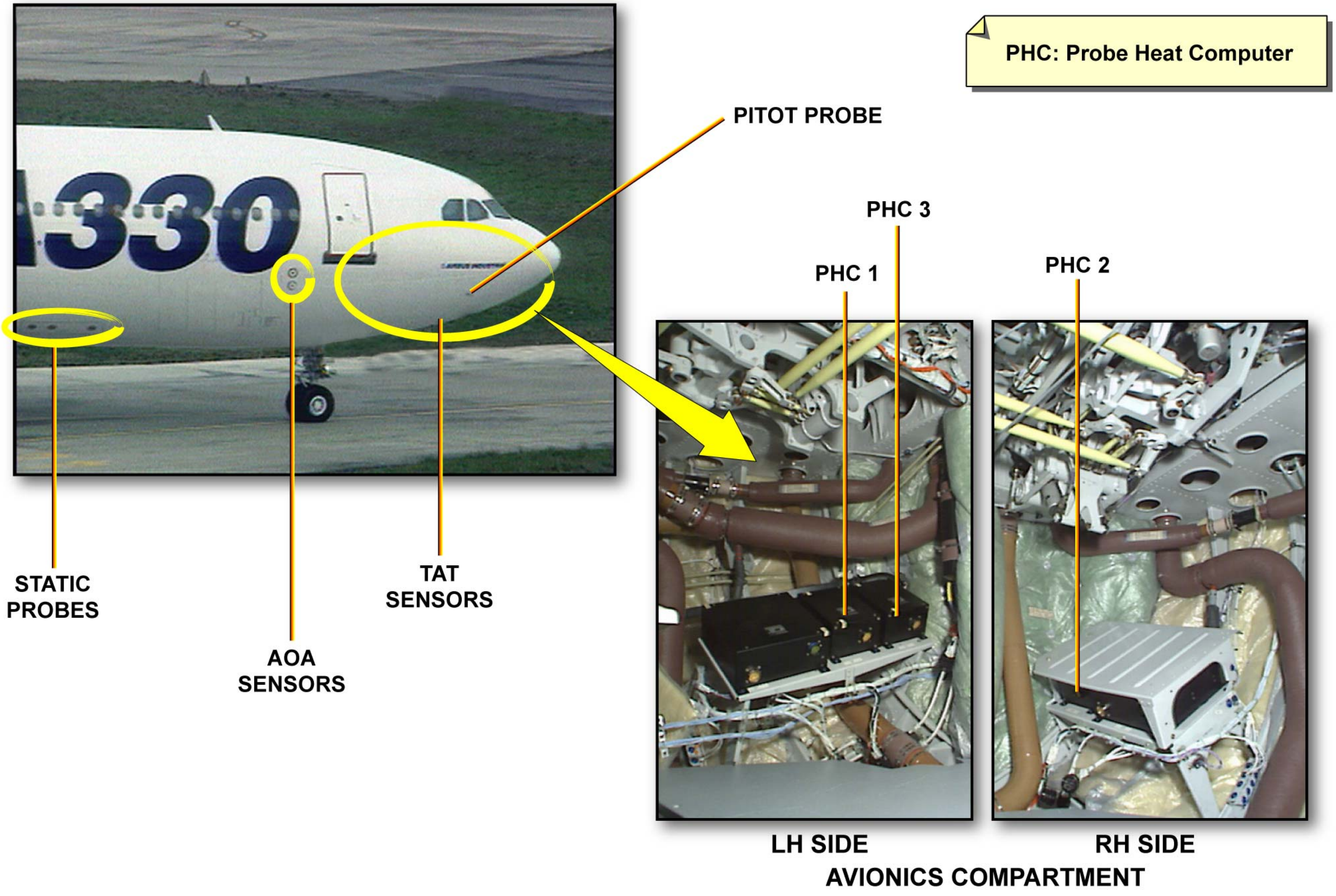
PROBE ICE PROTECTION

30 ICE & RAIN PROTECTION SYS PRES. (RR700) (1)

PROBE ICE PROTECTION (continued)

COMPONENT LOCATION

The CAPT and STBY probes and sensors are located on the LH side of the FWD fuselage. The F/O probes and sensors are located on the RH side of the FWD fuselage. The PHCs are installed on the LH and RH side of the avionics compartment.

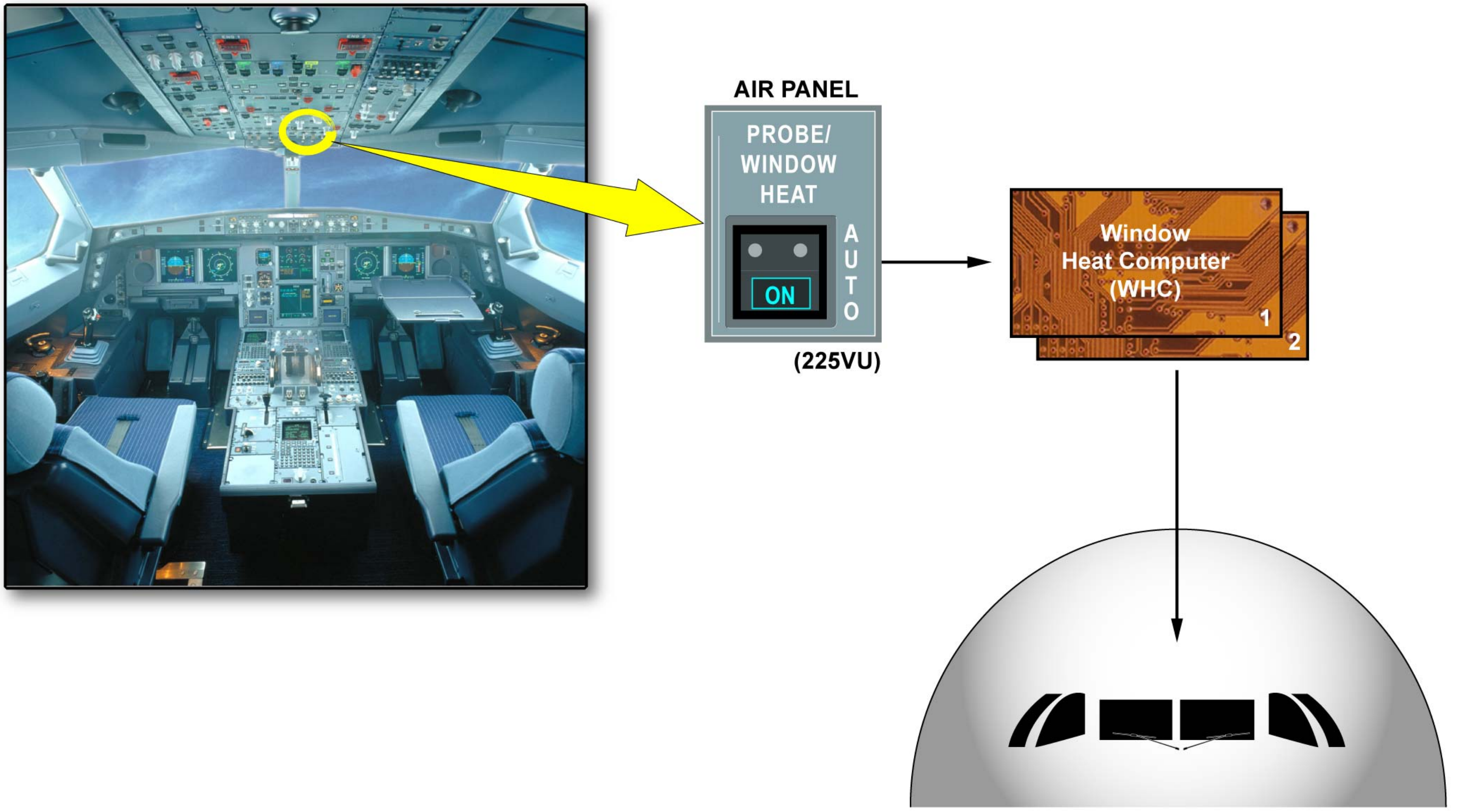


PROBE ICE PROTECTION - COMPONENT LOCATION

30 ICE & RAIN PROTECTION SYS PRES. (RR700) (1)

WINDSHIELD ANTI-ICING

Windshields and side windows are electrically heated to maintain clear visibility in icing or misting conditions. Windshields are de-iced and side windows are dimisted. The windshield heating operates at low power on ground and at full power in flight. Heating is automatically initiated at engine 2 or 3 start-up. The PROBE/WINDOW HEAT P/BSW overrides the automatic operation. Two fully independent Window Heat Computers (WHCs), one on each side, carry out the heat system monitoring and the overheat protection of their respective windshield and windows.



WINDSHIELD ANTI-ICING

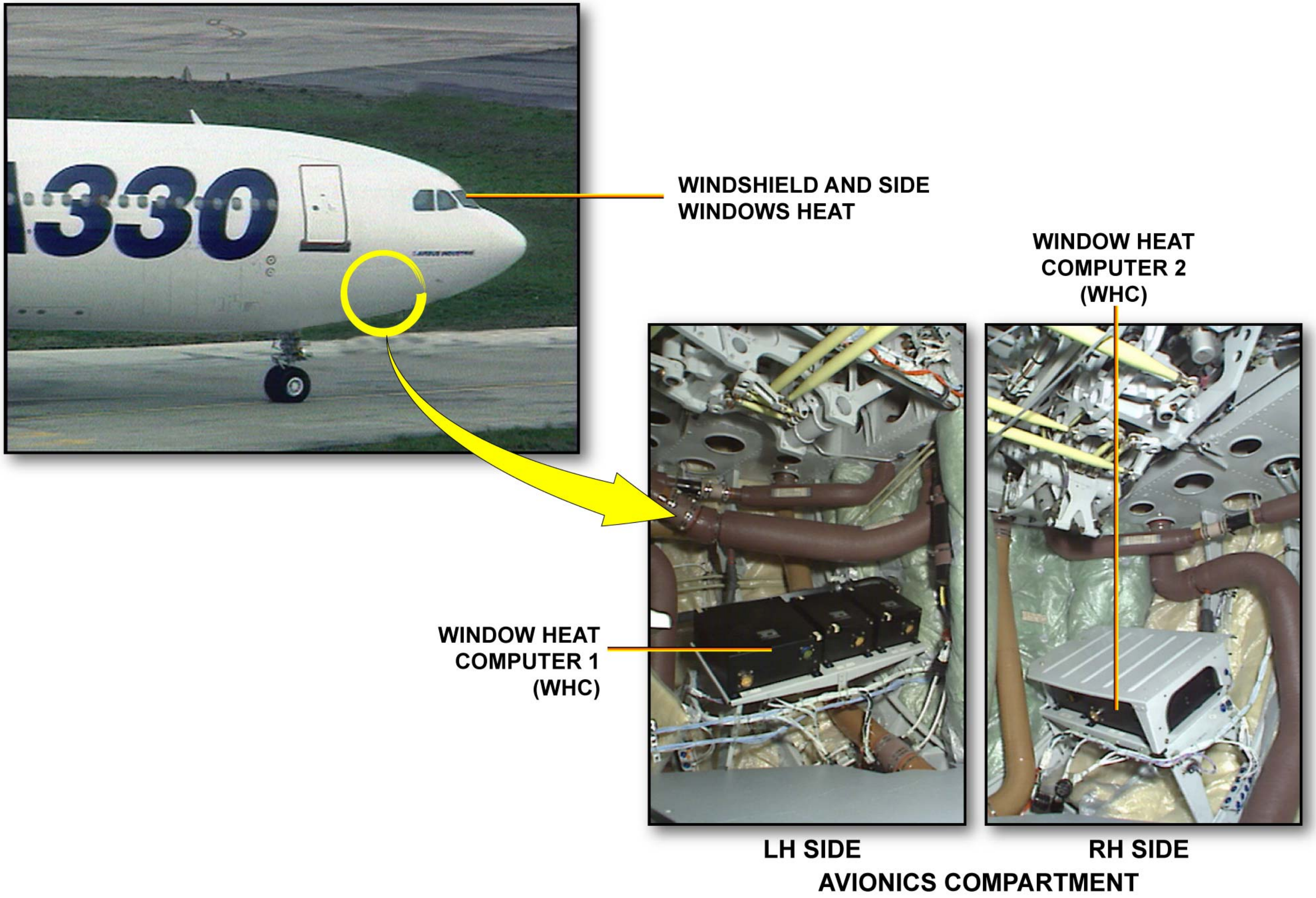
30 ICE & RAIN PROTECTION SYS PRES. (RR700) (1)

WINDSHIELD ANTI-ICING (continued)

COMPONENT LOCATION

The WHCs are installed in the avionics compartment:
- WHC 1 LH side (CAPT side),
- WHC 2 RH side (F/O side).

G6B08031 - G10T4T0 - FM30P9000000003

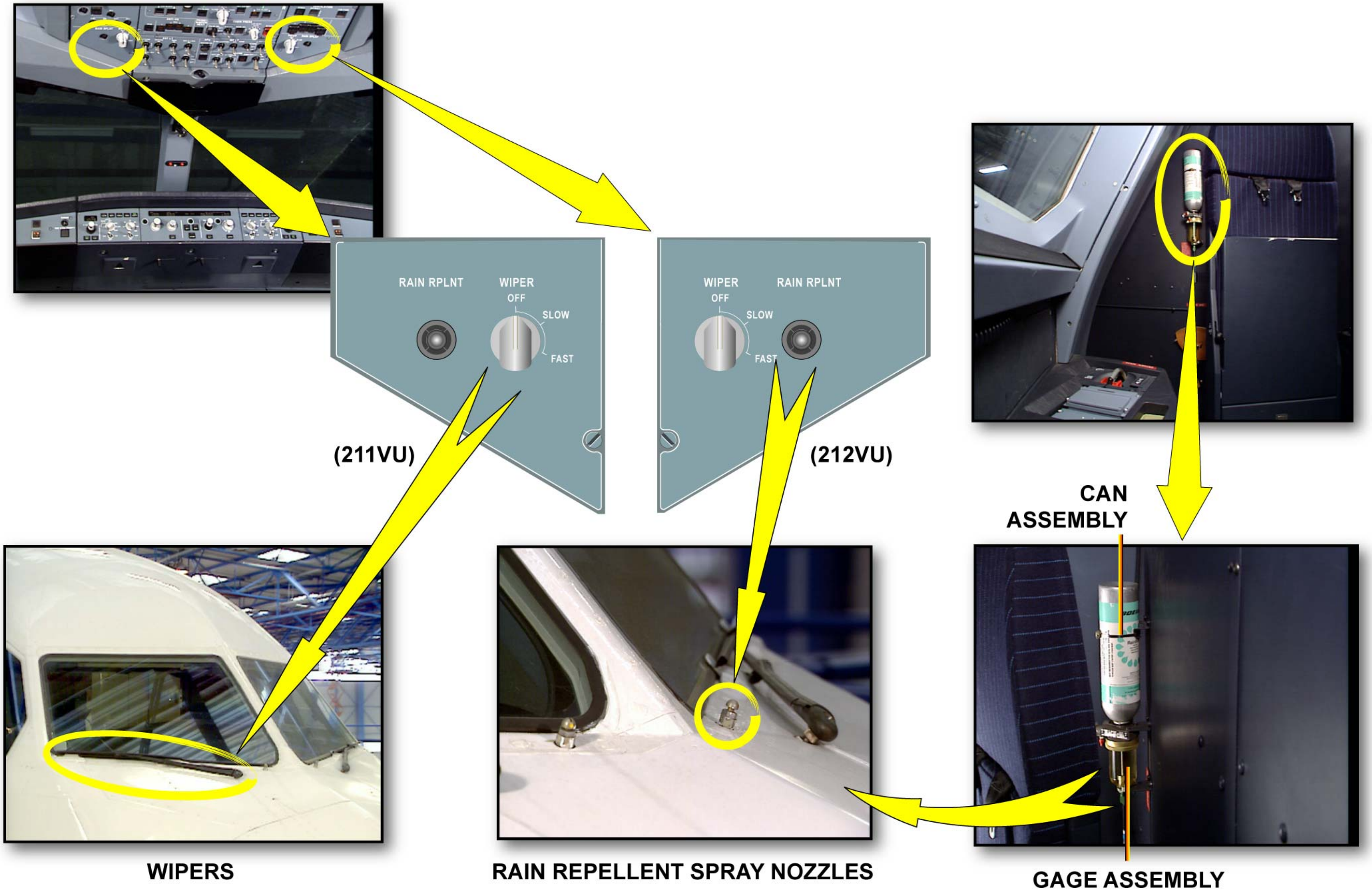


WINDSHIELD ANTI-ICING - COMPONENT LOCATION

30 ICE & RAIN PROTECTION SYS PRES. (RR700) (1)

RAIN PROTECTION

Rain removal from the windshield is done by two independent wipers and in heavy rain, by a rain repellent system. These systems are controlled from the overhead panel. The rain repellent fluid (FORALKYL 2211) is discharged onto the left or right windshield from a pressurized canister installed at the rear of the cockpit. The rain repellent system is inhibited on the ground when the engines are not running.



RAIN PROTECTION

G6B08031 - G10T4T0 - FM30P9000000003

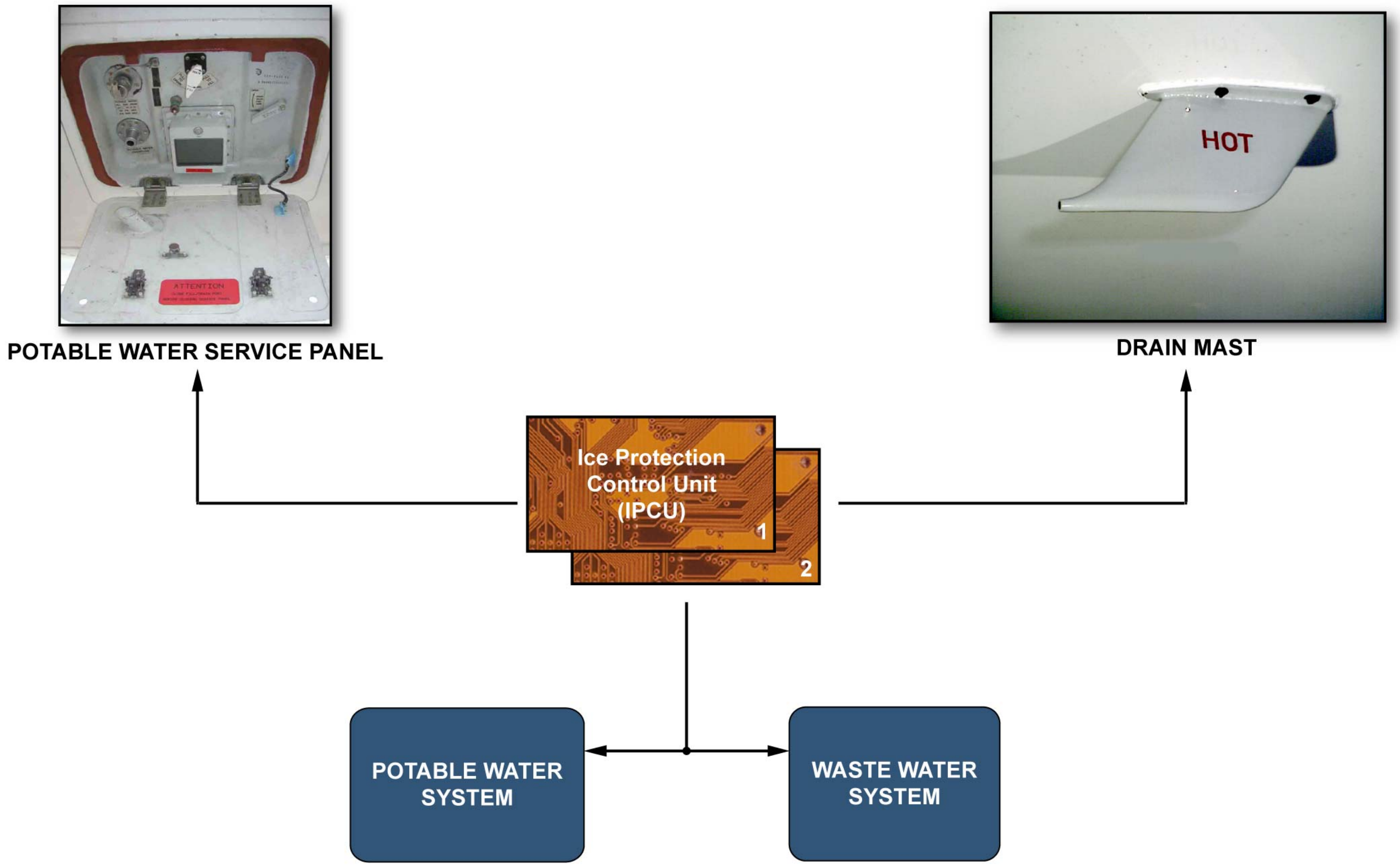
30 ICE & RAIN PROTECTION SYS PRES. (RR700) (1)

POTABLE AND WASTE WATER ICE PROTECTION

An automatic water ice protection system is installed to prevent ice formation in flight or on ground at freezing temperature on the following lines:
- the potable water,
- the waste water,
- the water servicing panels,
- the drain masts.

Heating of these water lines is controlled and monitored by two Ice Protection Control Units (IPCUs) based upon information received from temperature sensors installed on these lines. One IPCU controls the lines of the aircraft forward section, the second one the lines of the aft section.

G6B08031 - G10T4T0 - FM30P9000000003



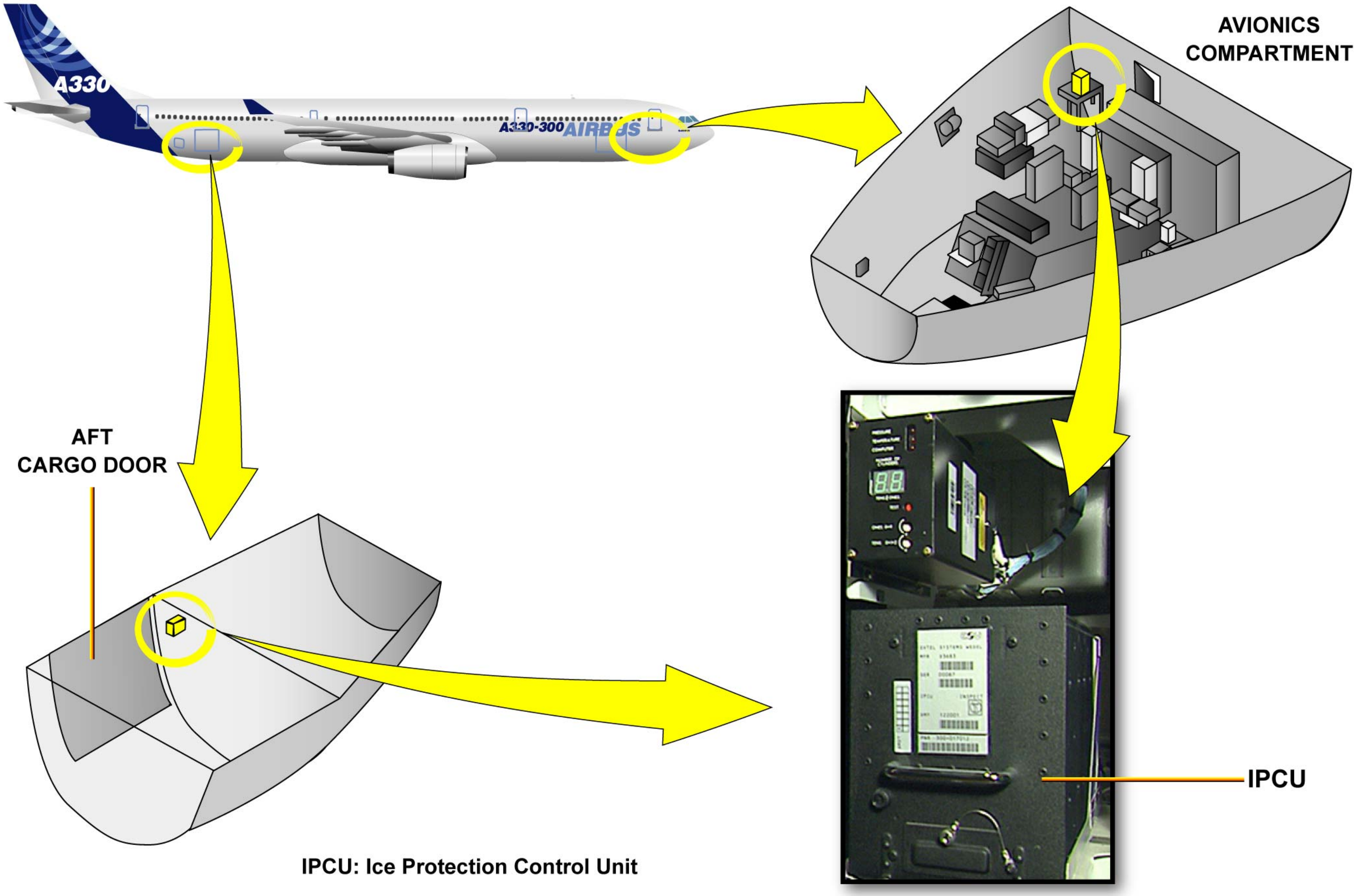
POTABLE AND WASTE WATER ICE PROTECTION

30 ICE & RAIN PROTECTION SYS PRES. (RR700) (1)

POTABLE AND WASTE WATER ICE PROTECTION (continued)

COMPONENT LOCATION

One IPCU is installed in the avionics compartment, the other one is in the AFT cargo compartment.



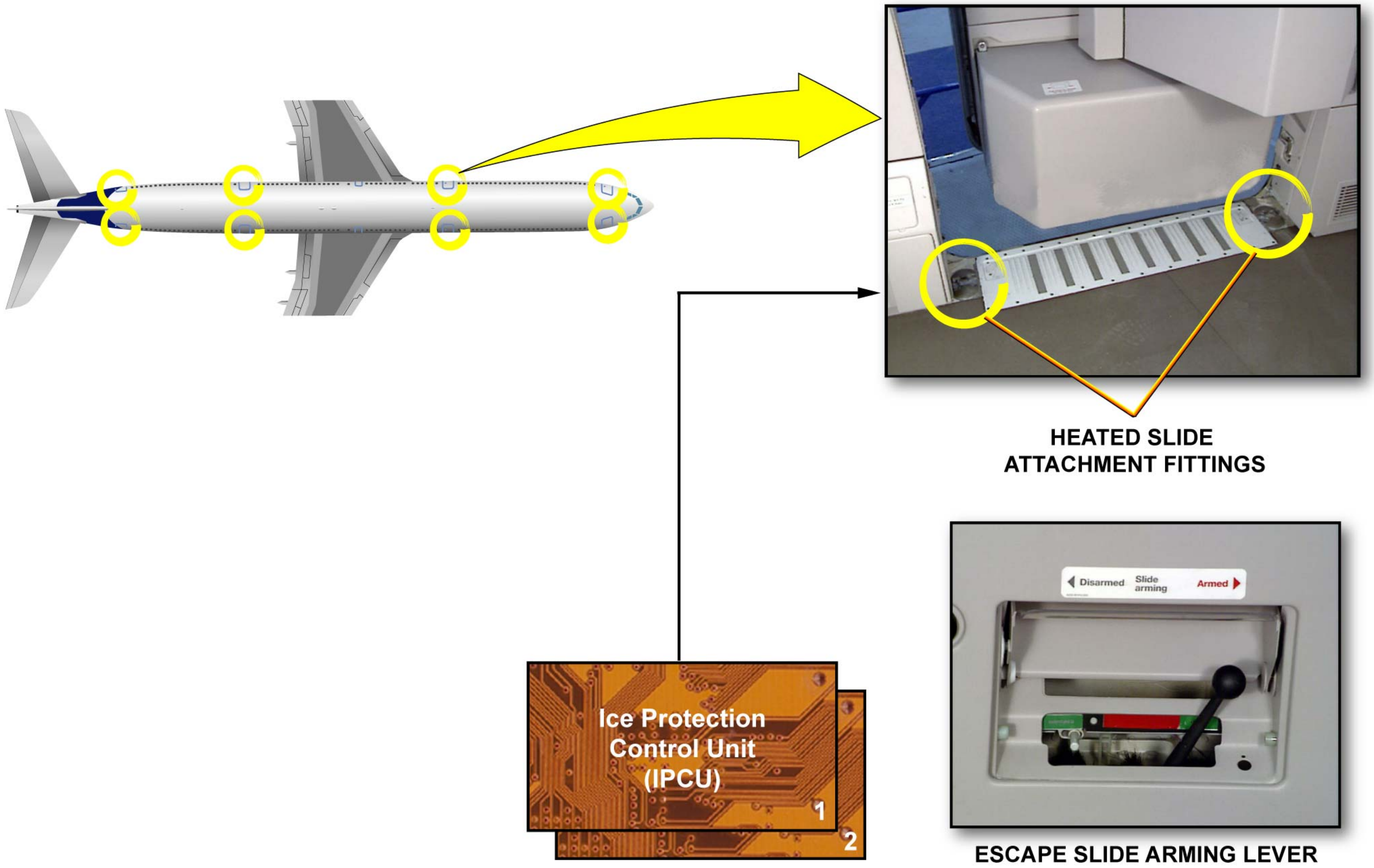
POTABLE AND WASTE WATER ICE PROTECTION - COMPONENT LOCATION

G6B08031 - G10T4T0 - FM30P9000000003

30 ICE & RAIN PROTECTION SYS PRES. (RR700) (1)

ESCAPE SLIDE LOCKING MECHANISM ICE PROTECTION

An electrical ice protection system prevents ice accretion on the Slide Attachment Fittings (SAFs) during flight that could lead to escape slide disarming difficulties on ground at door opening. Each passenger/crew door has two heated SAFs. On the A340-600, the overwing-emergency exits have no heated SAFs. The heating elements located in the related locking plate are powered automatically when icing conditions are detected, if the escape slide is armed. The system is controlled and monitored by two IPCUs, one for doors 1 and 2 (LH and RH) and one for doors 3 and 4 (LH and RH).



ESCAPE SLIDE LOCKING MECHANISM ICE PROTECTION

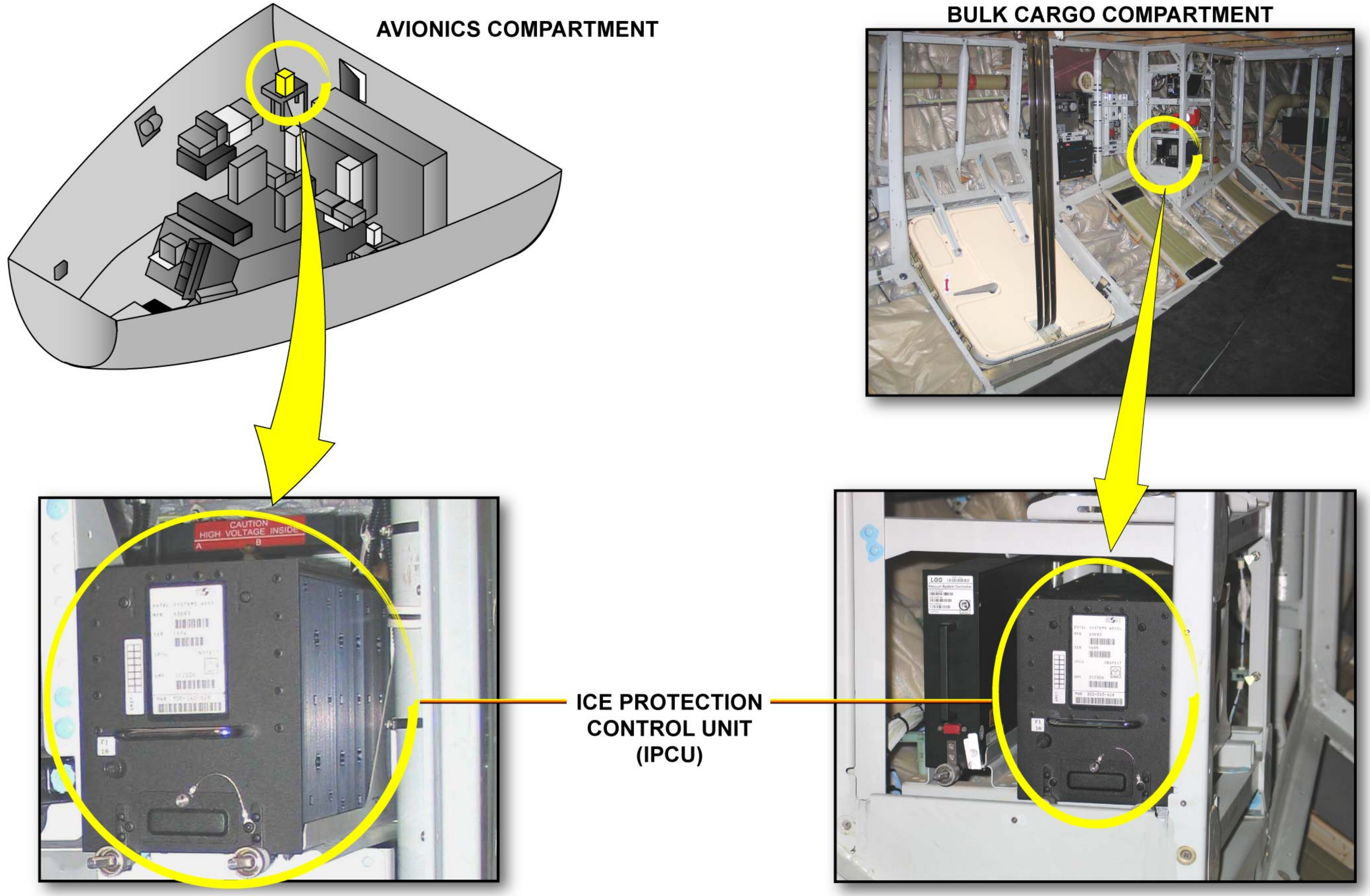
30 ICE & RAIN PROTECTION SYS PRES. (RR700) (1)

ESCAPE SLIDE LOCKING MECHANISM ICE PROTECTION (continued)

COMPONENT LOCATION

One IPCU is installed in the avionics compartment; the other one is installed in the bulk cargo compartment.

G6B08031 - G10T4T0 - FM30P9000000003



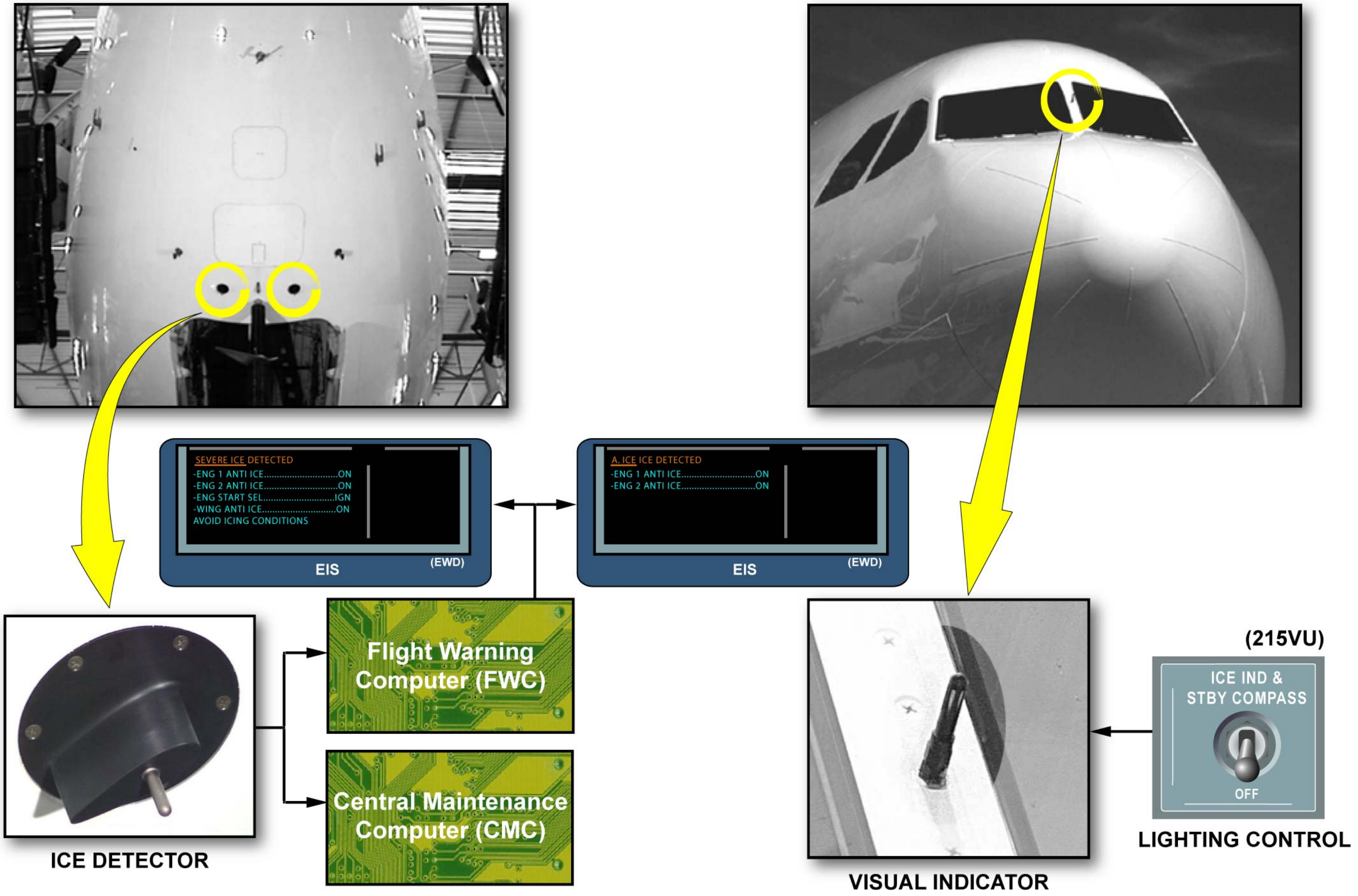
ESCAPE SLIDE LOCKING MECHANISM ICE PROTECTION - COMPONENT LOCATION

30 ICE & RAIN PROTECTION SYS PRES. (RR700) (1)

ICE DETECTION

An external visual ice indicator with an integrated light is installed between both windshields to be visible from the CAPT and F/O sides. This indicator light comes on from the ICE INDicator & STandBY COMPASS selector switch on the INTerior LighT panel. In icing conditions, the ice accretion on the indicator prevents the integrated light to be visible from the cockpit.
In addition, a dual advisory ice detection system is installed to give:
- a better detection of icing conditions,
- fuel saving by cutting off the anti-icing systems when the latter is no longer necessary.

The dual advisory ice detection system is made of two ice detectors installed on the skin of the aircraft and directly connected to the FWC to send warning messages to the crew on the EWD. Two levels of detections are given:
- ICE DETECTED used for the selection of engine anti-ice,
- SEVERE ICE DETECTED used for the selection of wing anti-ice.



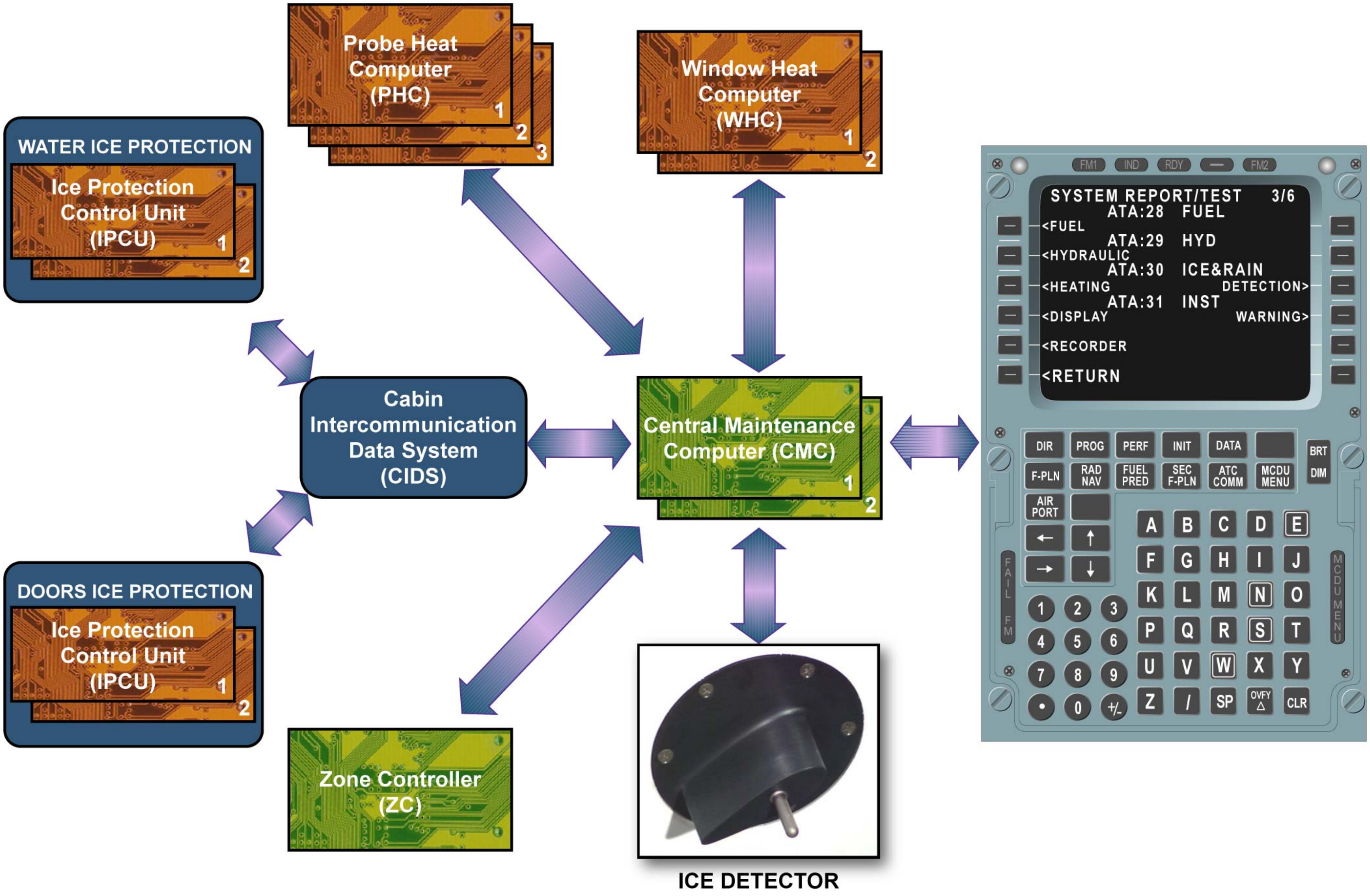
ICE DETECTION

G6B08031 - G10T4T0 - FM30P9000000003

30 ICE & RAIN PROTECTION SYS PRES. (RR700) (1)

MAINTENANCE/TEST FACILITIES

The WHCs, the PHCs, the ice detector system, and the ZC are connected to the CMCs for maintenance tasks. The IPCUs are also connected to the CMCs but via the Cabin Intercommunication Data System (CIDS).



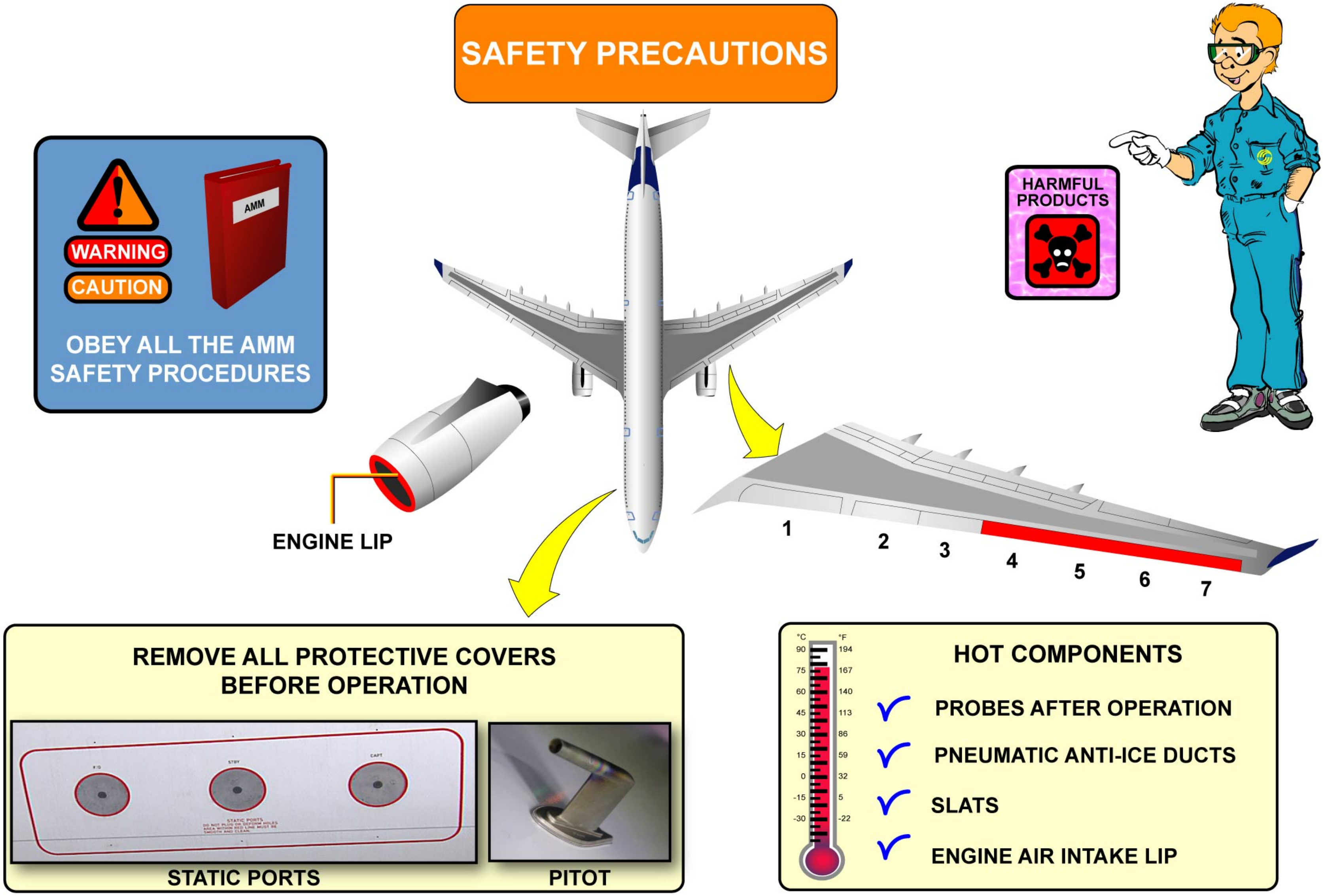
MAINTENANCE/TEST FACILITIES

G6B08031 - G10T4T0 - FM30P9000000003

30 ICE & RAIN PROTECTION SYS PRES. (RR700) (1)

SAFETY PRECAUTIONS

When you work on the ice and rain protection system, make sure that you obey all the AMM safety procedures. This will prevent injury to persons and/or damage to the aircraft. Here is an overview of the main safety precautions relative to the ice and rain protection system.
Remove the probes protective covers before activating the probe ice protection system. Do not touch the probes during or immediately after operation. The probes are hot and can burn a person.
Do not touch the anti-ice ducts, slats and engine air intake lips until they are cool. Those items stay hot for some time after the engine stops and can burn a person.
Use solvents/cleaning agents, sealants and other special materials only with a good flow of air through the work area. Put on protective clothing, rubber gloves, goggles and mask.



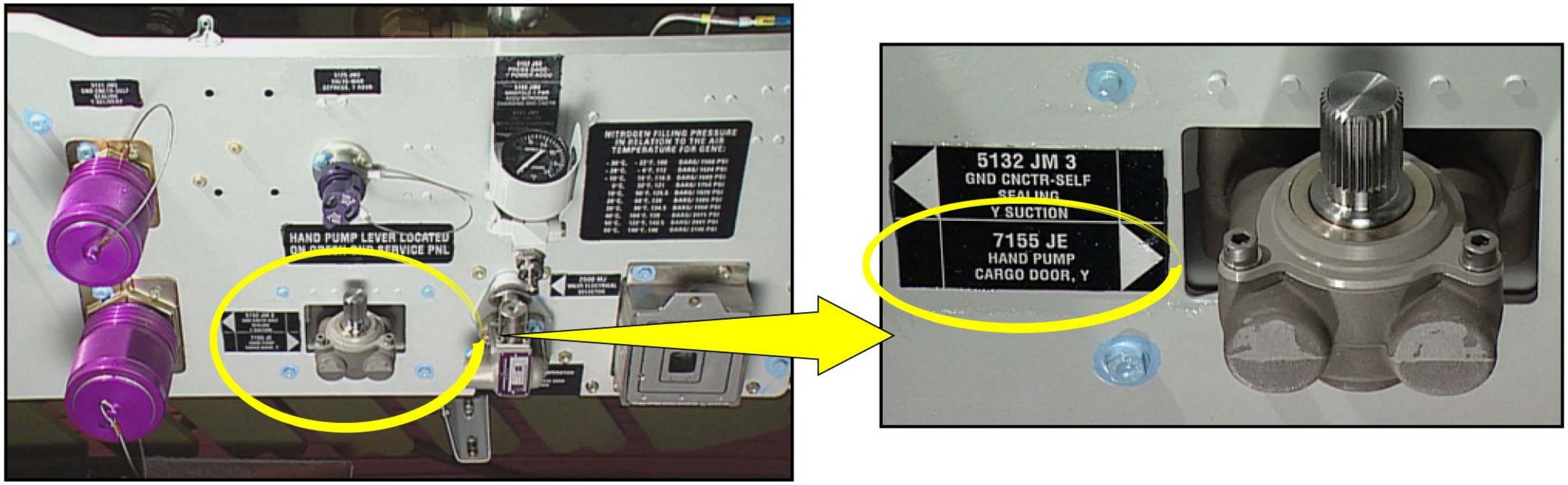
SAFETY PRECAUTIONS

00 CIRCUIT IDENTIFICATION PRESENTATION (1)

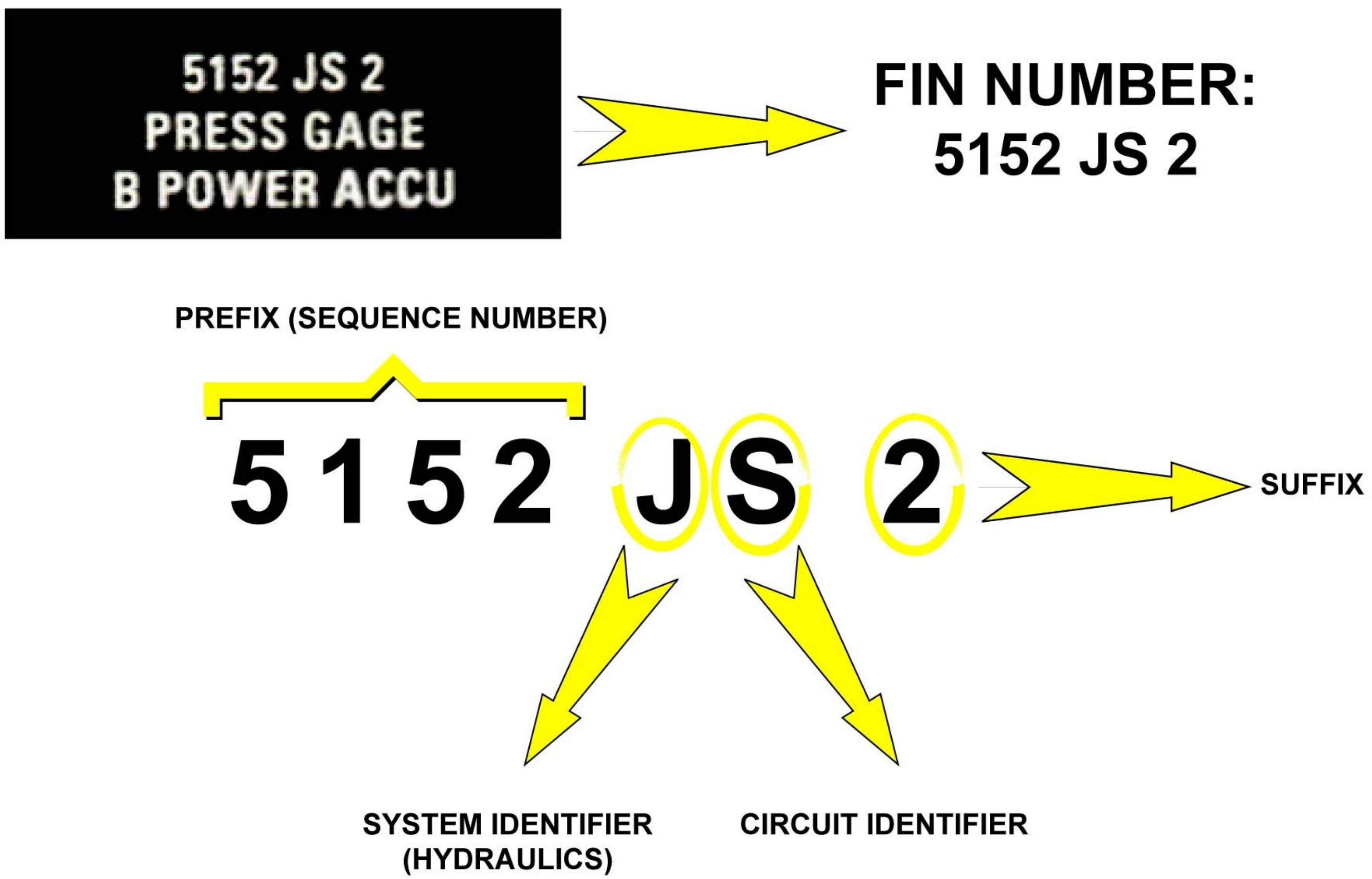
FIN PRESENTATION

Equipment on the A/C is identified by a unique identifier designated the Functional Item Number (FIN). Used in numerous manuals, the FIN uniquely identifies an item performing a function in an A/C system.
The FIN is composed of:
- a two-letter code indicating to which system and circuit the equipment belongs to,
- prefix (sequence number) and/or suffixes which provide the unique identification for individual items of equipment, the prefix indicating the position in the circuit. An item performing the same function in the same system throughout the A/C can have the same basic FIN with different suffix numbers, (generally odd numbers for left hand side, even numbers for right hand side).

A complete list of system/circuit identifiers is given in the introduction of the wiring manuals - Aircraft Schematic Manual (ASM)/Aircraft Wiring Manual (AWM). Here is an example of a list of the circuit identifications.



FIN PRESENTATION



FIN PRESENTATION

FIN IDENTIFICATION OF SYSTEMS

- C - Flight Controls System
- D - De-Icing
- E - Engine Monitoring
- F - Flight Instrumentation
- G - Landing Gear
- H - Air Conditioning
- J - Hydraulics →
- K - Engine/APU Control & Starting
- L - Lighting
- M - Interior Arrangement
- N - Wiring
- P - DC Generation
- Q - Fuel
- R - Radio (Nav. & Comm.)
- S - Radar Navigation
- T - Recording
- V - Fictitious Circuits
- W - Fire Protection & Warning System
- X - AC Generation

J - HYDRAULICS

- JB - Blue main hyd. power
- JC - Blue aux. power
- JG - Green main hyd. power
- JJ - Yellow aux. hyd. power
- JL - Ground Internal Leak Test
- JR - Green aux. Hyd. power
- JS - Hyd. System Data Acquisition interface and indicating
- JV - Green aux. hyd. power
- JX - Power transfer
- JY - Yellow main hyd. power

FIN PRESENTATION

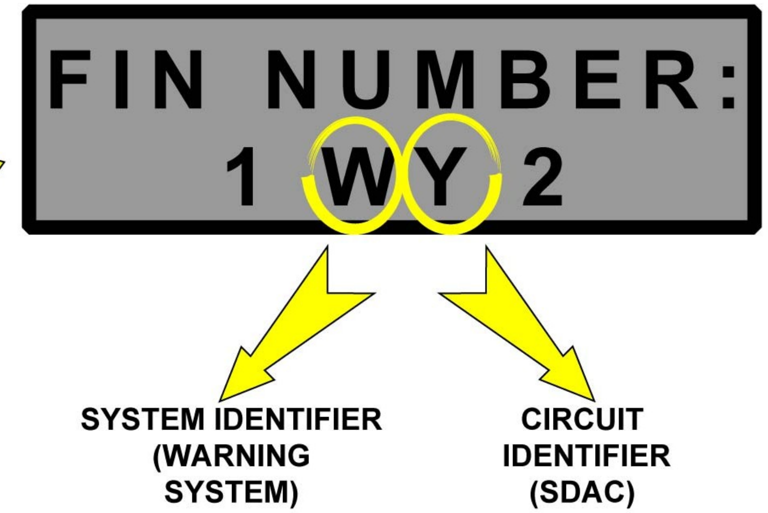
00 CIRCUIT IDENTIFICATION PRESENTATION (1)

FIN PRESENTATION (continued)

ELECTRICAL EQUIPMENT

For electrical equipment (any component with an electrical connection), the prefix (sequence number) will be below 5000. Here is an example for the electrical and electro-mechanical systems/circuits.

IDENTIFICATION OF ELECTRICAL AND ELECTRO-MECHANICAL SYSTEMS/CIRCUITS



FIN PRESENTATION - ELECTRICAL EQUIPMENT

00 CIRCUIT IDENTIFICATION PRESENTATION (1)

FIN PRESENTATION (continued)

CONNECTORS

Connectors which are part of an item have the same FIN number as the item, with the addition of a letter after the suffix characters.

PRESSURE SWITCH + CONNECTOR

FIN PRESENTATION - CONNECTORS

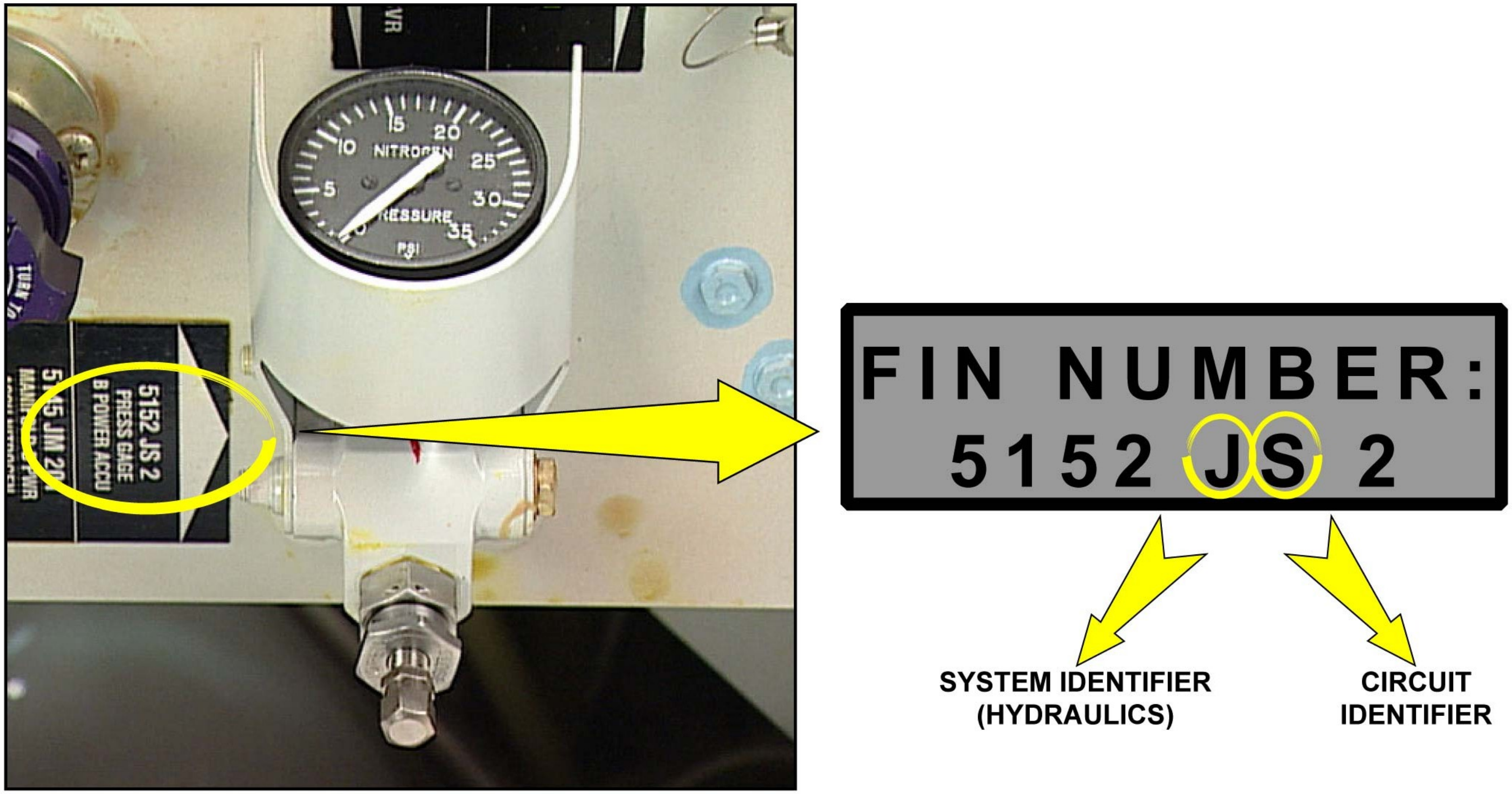
00 CIRCUIT IDENTIFICATION PRESENTATION (1)

FIN PRESENTATION (continued)

MECHANICAL EQUIPMENT

For mechanical equipment (without electrical connection), the prefix will be above 5000. Here is an example for the mechanical equipment.

IDENTIFICATION OF MECHANICAL SYSTEMS/COMPONENTS



G6B08031 - G10T4T0 - FM01P1000000002

FIN PRESENTATION - MECHANICAL EQUIPMENT

00 CIRCUIT IDENTIFICATION PRESENTATION (1)

FIN PRESENTATION (continued)

FICTITIOUS COMPONENTS

All components, not specifically related to a circuit, are identified by the fictitious circuit letter V. The circuit letter defines the type of component. The panels and racks are identified by the letters VU or VE.

V - FICTITIOUS CIRCUITS

VB - Main Wire routings
VC - A/C electrical connectors
VD - Diode modules
VE - Panels (Commercial)
VG - Ground terminal blocks
VN - Ground points
VP - Pressure seals
VS - Splices
VT - Terminal blocks
VU - Panels
VX - Printed circuit board assemblies
VZ - Spare wires

FIN PRESENTATION - FICTITIOUS COMPONENTS

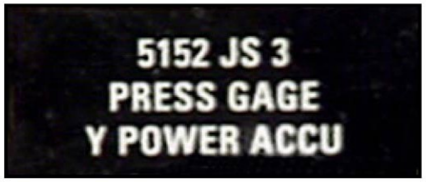
G6B08031 - G10T4T0 - FM01P1000000002

00 CIRCUIT IDENTIFICATION PRESENTATION (1)

PLACARDS

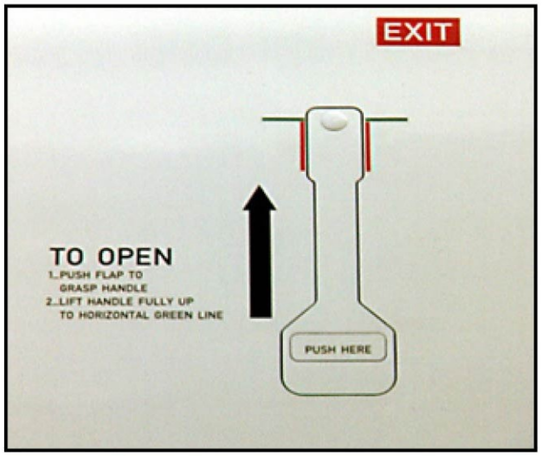
As a general rule, operating or installation instructions, directional movement instructions, servicing, part or position identifications, rescue and evacuation instructions and safety precautions shall be marked with placards, nameplates stencils or markings. Here are various examples:
- safety placard,
- fin placard,
- component placard,
- operational placard.

SAFETY PLACARD

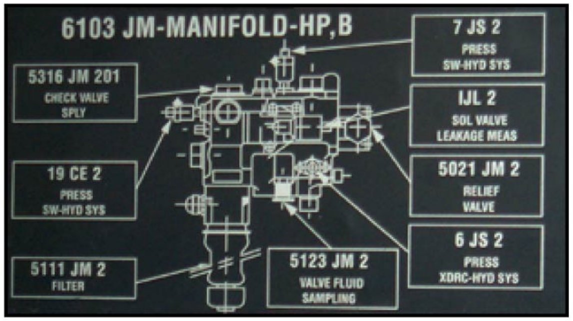


FIN PLACARD

PLACARDS EXAMPLES



OPERATIONAL PLACARD



COMPONENT PLACARD

PLACARDS

G6B08031 - G10T4T0 - FM01P1000000002

05 TIME LIMITS AND MAINTENANCE CHECKS (1)

SCHEDULED / UNSCHEDULED MAINTENANCE CHECKS IN THE AMM / MPD

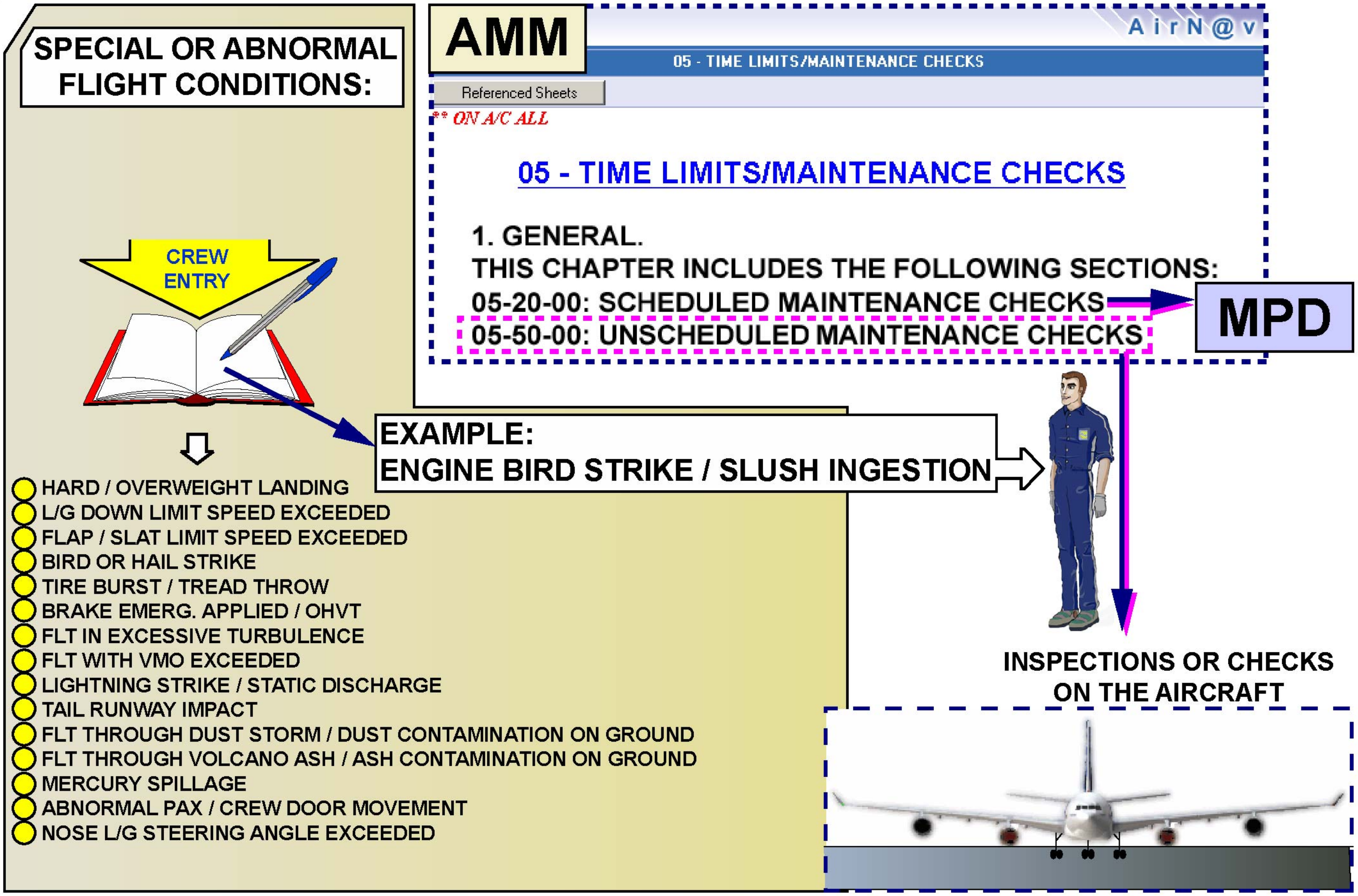
This chapter includes the following sections:
- scheduled maintenance tasks and checks,
- unscheduled maintenance checks.

SCHEDULED MAINTENANCE TASKS & CHECKS - IN MPD

This Chapter 05-20-00 "Life Limits and Maintenance Checks" is now covered in the Maintenance Planning Document (MPD).
The MPD is the repository document for all repetitive scheduled maintenance tasks promulgated by Airworthiness Directives (AD/CN), All Operator Telex (AOT), Inspection Service Bulletins (ISB), Service Information Letters (SIL), and Modifications (MOD/SB) and analyzed under the Maintenance Review Board (MRB).

UN-SCHEDULED MAINTENANCE - IN AMM SECTION 05-50-00

This Chapter 05-50-00 includes the maintenance checks that you must do when a flight crew report shows abnormal flight conditions.
Such maintenance actions are divided into two categories of information:
- inspections,
- checks.



SCHEDULED / UNSCHEDULED MAINTENANCE CHECKS IN THE AMM / MPD - SCHEDULED MAINTENANCE TASKS & CHECKS - IN MPD & UN-SCHEDULED MAINTENANCE - IN AMM SECTION 05-50-00

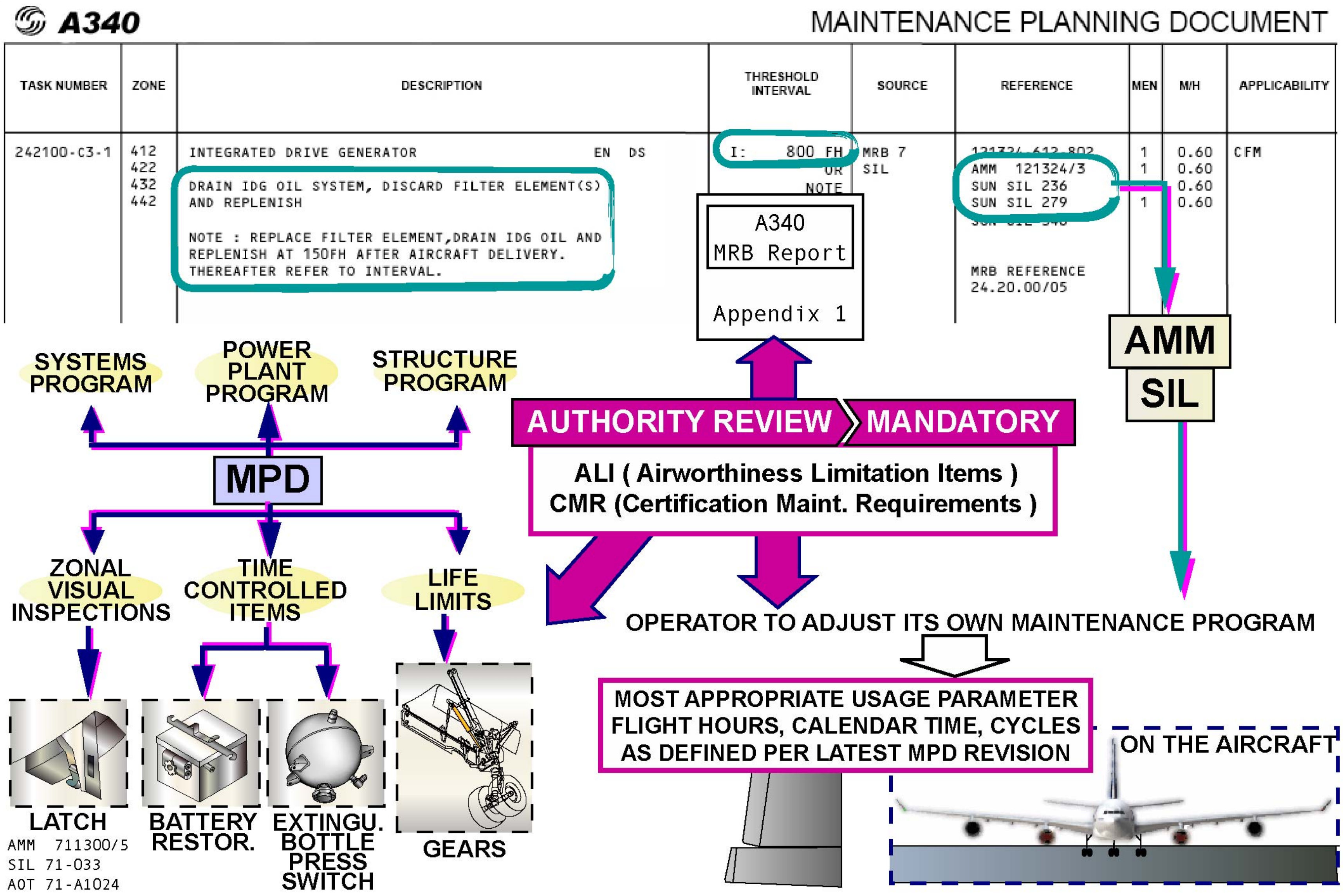
05 TIME LIMITS AND MAINTENANCE CHECKS (1)

SCHEDULED REPETITIVE REQUIREMENTS THROUGH MPD

The main objective of the MPD document is to provide maintenance planning information necessary for each operator to develop a customized maintenance program.
MPD reflects all repetitive scheduled maintenance tasks promulgated by AD/CN, AOT, ISB, SIL, and MOD/SB and analyzed under the MRB.
A typical scheduled repetitive task (Integrated Drive Generator (IDG) scavenge filter) is listed with the following data:
- the threshold interval, source document, cross-references to other manuals or documents (Aircraft Maintenance Manual (AMM) and SIL),
- Man Hours required to accomplish the work,
- the applicability in this Envelope document.

Note the Zonal inspection, requested by C CHECK interval, on the tension of the fan cowl latches, the AOT, AMM and SIL cross-referenced.
Some maintenance tasks have a higher ranking of requirement, when the maintenance requirement is identified as:
- "Airworthiness Limitations Item" (ALI) or "Life limit parts",
- "Certification Maintenance Requirements" (CMR).

The approved document MRB REPORT Appendix 1 lists all these airworthiness approved issues, the ALIs and CMRs.
The MPD details these airworthiness related items in the "Time controlled Items" and "Life Limits" sections.
It is the responsibility of each operator to adjust his own maintenance program in accordance with his National Authority.



SCHEDULED REPETITIVE REQUIREMENTS THROUGH MPD

G6B08031 - G10T4T0 - FM05PZ000000001

AIRBUS

AIRBUS S.A.S.
31707 BLAGNAC cedex, FRANCE
STM
REFERENCE G6B08031
JANUARY 2008
PRINTED IN FRANCE
AIRBUS S.A.S. 2008
ALL RIGHTS RESERVED

AN EADS JOINT COMPANY
WITH BAE SYSTEMS